ENVIRONMENTAL ASSESSMENT FOR THE OUTGRANT OF REAL ESTATE AND CONSTRUCTION OF A JP-8 PIPELINE AND RECEIVING FACILITY AT TRAVIS AIR FORCE BASE

KINDER MORGAN ENERGY PARTNERS

DEPARTMENT OF THE AIR FORCE
AIR MOBILITY COMMAND

NOVEMBER 2009

FINDING OF NO SIGNIFICANT IMPACT
AND
FINDING OF NO PRACTICABLE ALTERNATIVE

ENVIRONMENTAL ASSESSMENT
FOR THE OUTGRANT OF REAL ESTATE AND
CONSTRUCTION OF A JP-8 PIPELINE AND RECEIVING FACILITY
AT TRAVIS AFB, SOLANO COUNTY, CALIFORNIA

INTRODUCTION

U.S. Department of the Air Force (USAF) decisions on proposed actions and alternatives must take potential environmental impacts into consideration in accordance with the National Environmental Policy Act (NEPA) of 1969 (40 U.S. Code §§ 4321-4347), Council on Environmental Quality (CEQ) regulations that implement NEPA (40 Code of Federal Regulations [CFR] §§ 1500-1508), and the USAF *Environmental Impact Analysis Process* (EIAP) (32 CFR §§ 989 *et seq.*). An Environmental Assessment (EA) has been prepared for the Proposed Action, two project alternatives, and the No-Action Alternative in accordance with NEPA, CEQ regulations, and the USAF EIAP, and is incorporated into the findings below. This Finding of No Significant Impact (FONSI), the integrated Finding of No Practicable Alternative (FONPA), and the attached EA have been prepared based on analyses of the affected environment and anticipated environmental consequences of the Proposed Action, two project alternatives, and the No-Action Alternative.

PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The existing jet fuel (JP-8) distribution and dispensation infrastructure at Travis Air Force Base (AFB) is nearing capacity and is presently served by approximately 7 miles of USAF-owned and operated, off-base pipeline. The identified security and capacity shortfalls potentially limit the ability of the USAF to maintain and operate base-assigned and other aircraft at Travis AFB.

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action would involve the outgrant of real estate on Travis AFB to SFPP, LP (SFPP) upon which SFPP would install, own, operate, and maintain an approximately 1.9-mile JP-8 pipeline and associated facilities. The USAF proposes the following activities described below:

- Installation of an approximately 1.4-mile 16-inch belowground pipeline on Travis AFB, of which 0.3 mile would be installed by conventional trenching and 1.1 miles would be installed by horizontal directional drilling (HDD).[1]
- Installation of an approximately 0.5-mile 10-inch belowground pipeline on Travis AFB by conventional trenching.
- Construction of a junction station at the western edge of Travis AFB to access an existing SFPP-owned, multi-product petroleum pipeline adjacent to the base.
- Construction of a JP-8 receiving facility on Travis AFB near the existing receiving facility, with three 150,000-barrel JP-8 breakout tanks, containment, and associated equipment.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, existing JP-8 distribution and dispensation infrastructure at Travis AFB—and identified security and capacity shortfalls—would remain unchanged.

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[1] HDD is a process of installing pipelines belowground between two points without any surface disturbance along the pipeline footprint.

Under the No-Action Alternative, there would be no change in or adverse effects on the quality of the human or natural environment; and there would be no action taken to address the identified security and capacity shortfalls in existing facilities and to provide greater storage capacity and improved functionality to operate aircraft for mission requirements at Travis AFB.

SUMMARY OF ANTICIPATED ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED ACTION

Based on the analyses accomplished as a part of the EA, which is incorporated herein by reference, I determine that no significant adverse effects are expected on any resource area as a result of implementation of the Proposed Action. The Proposed Action would result in less than significant impacts or no effects to air quality; noise; wastes, hazardous materials, and stored fuels; socioeconomic resources; cultural resources; land use; transportation systems; or environmental justice. Analyses presented in the EA also indicate that the Proposed Action would not result in or contribute to significant negative cumulative or indirect impacts to resources of the region, provided prescribed mitigation measures are implemented. Effects to water resources, biological resources, safety and occupational health, and environmental management are further described below.

Water Resources. Aquatic resources in the project footprint would be temporarily and permanently impacted by implementation of the Proposed Action. Project construction would permanently fill 0.017 acre of non-wetland jurisdictional waters, and temporarily impact 0.054 acre of non-wetland jurisdictional waters, both of which have habitat suitable for the special-status species Contra Costa goldfields (*Lasthenia conjugens*). However, restoration of temporarily impacted areas to pre-construction conditions within one year of initiation of project activities and compensation for permanent impacts at an approved mitigation bank would reduce impacts to less than significant levels. Mitigation measures and special conditions required by the U.S. Fish and Wildlife Service (USFWS), Sacramento Office; the U.S. Army Corps of Engineers (USACE), San Francisco District; and the California State Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, are described in *Mitigation* below.

Biological Resources. Implementation of the Proposed Action would result in both temporary and permanent impacts to suitable special-status species habitat located in the project footprint. Project construction would permanently fill 0.017 acre of non-wetland jurisdictional waters, and temporarily impact 0.054 acre of non-wetland jurisdictional waters, both of which have habitat suitable for the special-status species Contra Costa goldfields. However, restoration of temporarily impacted areas to pre-construction conditions within one year of initiation of project activities and compensation for permanent impacts at an approved mitigation bank would reduce impacts to less than significant levels. The USFWS, Sacramento Office, issued a *Biological Opinion* (BO) pursuant to the Endangered Species Act on 29 October 2009. The BO found that implementation of the Proposed Action would not likely jeopardize Contra Costa goldfields or other special-status species. Mitigation measures and special conditions required by the USFWS; the USACE, San Francisco District; and the RWQCB, San Francisco Bay Region, are described in *Mitigation* below.

Safety and Occupational Health. Under the Proposed Action, the siting, construction, and operation of project components would comply with all applicable safety and occupational health standards. Potential human health hazards associated with activities occurring at an Environmental Restoration Program (ERP) Site within the project footprint would be addressed in a *Health and Safety Plan*.

Environmental Management. Implementation of the Proposed Action would be consistent with established Travis AFB pollution prevention directives. Construction-related impacts to soils would be temporary, and all impacted areas would be restored to pre-construction condition upon project completion. All activities at the ERP Site located within the project footprint would meet legal requirements established in a 2002 U.S. Environmental Protection Agency *Record of Decision*. Specifically, debris removal at the ERP Site would follow a *Site Characterization and Disposal Plan*.

MITIGATION

The USAF will implement and comply with all *Conservation and Minimization Measures* listed in the referenced USFWS BO, including mitigation for permanent impacts to 0.017 acre of non-wetland jurisdictional waters identified as suitable habitat for Contra Costa goldfields. Mitigation will protect Contra Costa goldfields habitat by the purchase of 0.153 acre of vernal pools with Contra Costa goldfields on a nearby property located within the watershed associated with the Proposed Action site. Temporary impacts to 0.054 acre of suitable habitat for Contra Costa goldfields will be mitigated by preparing and implementing all measures listed in the BO, and all temporarily impacted areas will be restored to pre-construction conditions within one year of initiation of project activities. The USAF will also comply with all *Incidental Take Statement* requirements for construction and post-construction activities listed in the referenced USFWS BO.

The USACE issued authorization under *Nationwide Permit 12* on 23 November 2009 for compliance with Section 404 of the Clean Water Act (CWA). The USAF will implement and comply with the requirement to purchase 0.153 acre of Contra Costa goldfields habitat within one year of the onset of construction activities. The USAF will also monitor temporarily impacted habitat areas for one year.

The RWQCB issued a *Water Quality Certification* under Section 401 of the CWA on 26 March 2010, and has approved initiation of construction under conditions listed in the Certification, including requirements to mitigate for temporary and permanent impacts to aquatic resources.

PUBLIC REVIEW AND INTERAGENCY COORDINATION

In accordance with USAF policy, a Notice of Availability (NOA) for the Draft EA was published on 12 August 2009 in two local newspapers, and copies of the document were placed in four local libraries and on the Travis AFB website. The NOA announced a 30-day public comment period on the Draft EA. A concurrent Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) process was conducted. No public comments were received during the 30-day review period, and all IICEP comments received during that period were incorporated into the EA. As described herein and in the attached EA, additional consultation occurred between the USAF and the USFWS, USACE, and RWQCB to obtain the BO, 404 permit and 401 certification, respectively.

FINDING OF NO PRACTICABLE ALTERNATIVE

Pursuant to Executive Order 11990, *Protection of Wetlands*, and considering information herein (including the attached EA), in accordance with, and pursuant to the authority delegated by Secretary of the Air Force Order 791.1, I find that there is no practicable alternative to the Proposed Action for installation of the 1.9-mile JP-8 pipeline and related facilities. The impact on wetlands due to installation of the project components would not be significant due to mitigation measures and best management practices that must be carried out with implementation of the Proposed Action.

FINDING OF NO SIGNIFICANT IMPACT

After a review of the EA prepared in accordance with the requirements of NEPA, and CEQ and EIAP regulations, I have determined that the Proposed Action would not have a significant impact on the quality of the human or natural environment; therefore, an Environmental Impact Statement does not need to be prepared. This decision has been made after taking into account all submitted information and considering the alternatives that would meet the project requirements.

Theresa C Carter

THERESA C. CARTER
Brigadier General, USAF
Director, Installations and Mission Support

22 JUNE 2010
Date

COVER SHEET
ENVIRONMENTAL ASSESSMENT
FOR THE OUTGRANT OF REAL ESTATE AND CONSTRUCTION OF A JP-8 PIPELINE AND RECEIVING FACILITY AT TRAVIS AFB

AGENCY

U.S. Department of the Air Force (USAF), Headquarters, Air Mobility Command (AMC), Scott Air Force Base (AFB), Illinois.

PROPOSED ACTION

Outgrant real estate on Travis AFB to install a jet fuel (JP-8) pipeline and receiving facility.

COMMENTS AND INQUIRIES

Written comments and inquiries regarding this document should be directed to:

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Mr. Scott Sjulin, AMEC Earth & Environmental, Inc., 2101 Webster Street, 12th Floor, Oakland, California 94612-3066, telephone: 510-663-4294, email: scott.sjulin@amec.com.

REPORT DESIGNATION

Environmental Assessment

ABSTRACT

The existing JP-8 distribution and dispensation infrastructure at Travis AFB is nearing capacity and is presently served by approximately 7 miles of USAF-owned and operated off-base pipeline. These identified security and capacity shortfalls potentially limit the ability to maintain and operate base-assigned and other aircraft at Travis AFB.

Each proposed alternative would involve the outgrant of real estate on Travis AFB to SFPP, LP (SFPP) upon which SFPP would install, own, operate, and maintain an approximately 1.9-mile JP-8 pipeline, receiving facility, and junction station. Pipeline installation would occur by conventional trenching and additional construction methods specific to each alternative. Under Alternative 1—the Proposed Action—approximately 1.1 miles of the pipeline would be installed by horizontal directional drilling. Under Alternative 2, five pipeline segments totaling approximately 0.2 mile would be installed by slick-bore. Under Alternative 3, approximately 1.2 miles of the pipeline would be installed aboveground, and an access road would be constructed adjacent to the aboveground pipeline segment. Under the No-Action Alternative, existing JP-8 distribution and dispensation infrastructure at Travis AFB—and identified security and capacity shortfalls—would remain unchanged.

Resources considered in the impact analyses were: air quality; noise; wastes, hazardous materials, and stored fuels; water resources; biological resources; socioeconomic resources; cultural resources; land use; transportation systems; safety and occupational health; environmental management; and, environmental justice. No significant impacts would result from implementation of the Proposed Action, Alternative 2, or the No-Action Alternative. Localized significant adverse impacts to water resources and biological resources would result from implementation of Alternative 3. No cumulative impacts would result from implementation of the Proposed Action, Alternative 2, Alternative 3, or the No-Action Alternative.

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KINDER MORGAN ENERGY PARTNERS

DEPARTMENT OF THE AIR FORCE
AIR MOBILITY COMMAND

NOVEMBER 2009

EXECUTIVE SUMMARY
ENVIRONMENTAL ASSESSMENT
FOR THE OUTGRANT OF REAL ESTATE AND CONSTRUCTION OF A JP-8 PIPELINE AND RECEIVING FACILITY AT TRAVIS AFB

ES-1 INTRODUCTION

Travis AFB is home to the largest AMC organization in the USAF, the 60th AMW, which operates three types of base-assigned aircraft. Operation of U.S. Navy, U.S. Coast Guard, and other transient aircraft also frequently occurs at the base. The existing JP-8 distribution and dispensation infrastructure at Travis AFB is nearing capacity and is presently served by approximately 7 miles of USAF-owned and operated off-base pipeline. These identified security and capacity shortfalls potentially limit the ability to maintain and operate base-assigned and other aircraft at Travis AFB, as well as fully implement existing AMC missions or anticipated future mission assignments.

ES-2 NEED FOR ACTION

The *need* for action is driven by identified security and capacity shortfalls in the existing JP-8 distribution and dispensation infrastructure at Travis AFB. Project implementation would enhance the ability of the base's personnel to maintain and operate base-assigned and other aircraft by increasing fuel storage and transport capacities, and would ensure that affected systems are consistent with modern environmental and safety standards.

ES-3 ALTERNATIVES INCLUDING THE PROPOSED ACTION

ES-3.1 ALTERNATIVE SELECTION PROCESS

The primary criteria applied in identifying feasible project alternatives included:

- The proximity to existing petroleum, oils, and lubricants (POL) facilities at Travis AFB, and the ability to tie into an existing off-base primary supply pipeline in close proximity to the proposed terminal within the base;
- The ability to provide protection and emergency response by locating facilities within Travis AFB property boundaries; and,
- The availability of necessary infrastructure (e.g., access and maintenance roads) and utilities to facilitate project construction and operation.

ES-3.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

During the outgrant site selection process, several additional siting alternatives were considered—but ultimately eliminated—due to inconsistencies with selection criteria outlined above. Inconsistencies associated with one eliminated alternative, installation of the pipeline along Air Base Parkway, are further described below:

- Tie-in pipelines between the existing off-base primary supply pipeline, proposed terminal, and existing Travis AFB POL facilities would be approximately 0.5 to 1.0 mile greater in length than other evaluated alternatives;

- Facilities would be partially located outside of Travis AFB property boundaries, thereby reducing the ability of the base to provide protection and emergency response; and,
- Project access would occur via Air Base Parkway, thereby resulting in partial closure of the base's main access road during construction, operation, and maintenance activities.

ES-3.3 ALTERNATIVE 1 (PROPOSED ACTION)

Under Alternative 1—the Proposed Action—approximately 32.60 acres of real estate on Travis AFB would be outgranted via easement and right-of-way (ROW) to SFPP, upon which SFPP would install, own, operate, and maintain the following:

- **Travis Junction –** a junction station to access an existing SFPP-owned multi-product petroleum pipeline adjacent to the base;
- **Travis Terminal –** a JP-8 receiving facility with three 150,000-barrel JP-8 breakout tanks, secondary containment, associated equipment, and access roads; and,
- **Travis Pipeline –** an approximately 1.9-mile belowground pipeline, including an approximately 1.4-mile 16-inch pipeline connecting the Travis Junction and Travis Terminal, and an approximately 0.5-mile 10-inch pipeline connecting the Travis Terminal to the existing Travis AFB *Bulk Fuels Receiving Facility* and JP-8 distribution and dispensation infrastructure. Approximately 1.1 miles of the Travis Pipeline would be installed by the use of horizontal directional drilling. All other pipeline segments would be installed by conventional trenching. Primary access for construction and maintenance would occur via the bed of an existing decommissioned rail spur located adjacent to the pipeline footprint.

ES-3.4 ALTERNATIVE 2

Under Alternative 2, approximately 35.29 acres of real estate on Travis AFB would be outgranted via easement and ROW to SFPP. Installation and operation of the Travis Junction and Travis Terminal would be the same as the Proposed Action. The Travis Pipeline would still be installed belowground; however, installation would occur by a combination of slick-bore along five pipeline segments totaling approximately 0.2 mile and by conventional trenching along all other pipeline segments. Primary pipeline construction and maintenance access would still occur via the decommissioned rail spur.

ES-3.5 ALTERNATIVE 3

Under Alternative 3, approximately 35.29 acres of real estate on Travis AFB would be outgranted via easement and ROW to SFPP. Installation and operation of the Travis Junction and Travis Terminal would be the same as the Proposed Action. Under this alternative, approximately 1.2 miles of the Travis Pipeline would be installed aboveground on the bed of the decommissioned rail spur. Primary pipeline construction and maintenance access along this segment would occur via an access road that would be constructed adjacent to the pipeline. The remaining approximately 0.7 mile of the pipeline would still be installed belowground by conventional trenching, and access along this segment would still occur via the decommissioned rail spur.

ES-3.6 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, existing JP-8 distribution and dispensation infrastructure at Travis AFB—and identified security and capacity shortfalls—would remain unchanged.

ES-4 DESCRIPTION OF PAST AND REASONABLY FORESEEABLE FUTURE ACTIONS

A total of six present and reasonably foreseeable future Travis AFB construction projects within 2 miles of the project footprint would occur concurrently with implementation of the alternatives described above. However, any physical changes associated with these projects would be limited to their respective footprints and none would result in cumulative impacts when combined with implementation of the alternatives above.

ES-5 SCOPE OF ENVIRONMENTAL REVIEW

Resources considered in the impact analysis were: air quality; noise; wastes, hazardous materials, and stored fuels; water resources; biological resources; socioeconomic resources; cultural resources; land use; transportation systems; safety and occupational health; environmental management; and, environmental justice. Installation and operation of the Travis Junction and Travis Terminal would be the same under each alternative. Accordingly, impacts associated with these project components are discussed only once. Installation and operation of the Travis Pipeline would vary depending on the selected alternative. Therefore, impacts associated with the pipeline are separately discussed for each alternative.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, established guidelines to ensure that citizens in these categories are not disproportionately affected by Federal actions, and potential health and safety impacts that could disproportionately affect children are considered under EO 13045, *Protection of Children from Environmental Health and Safety Risks*. Activities associated with implementation of the alternatives described above would not impose significant adverse impacts to environmental justice populations or significant adverse health and safety risks to children. Under the No-Action Alternative, conditions related to environmental justice would remain unchanged from baseline conditions.

ES-6 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALL ALTERNATIVES

Table ES-1 at the end of this section summarizes environmental impacts of the Proposed Action, Alternative 2, Alternative 3, and the No-Action Alternative.

ES-7 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

Alternative 1—the Proposed Action—is the Preferred Alternative based on a thorough examination of feasible alternatives and consideration of their anticipated environmental effects.

Table ES-1 Summary of Environmental Impacts for Alternative 1 (Proposed Action), Alternative 2, Alternative 3, and the No-Action Alternative

Resource	Alternative 1 (Proposed Action)	Alternative 2	Alternative 3	No-Action Alternative
Air Quality	The Proposed Action would result in short-term construction and long-term operational emissions that would not impede the attainment or maintenance of air quality standards.	Alternative 2 would result in short-term construction and long-term operational emissions that would not impede the attainment or maintenance of air quality standards.	Alternative 3 would result in short-term construction and long-term operational emissions that would not impede the attainment or maintenance of air quality standards.	Emissions would remain unchanged from baseline conditions.
Noise	The Proposed Action would result in temporary construction noise that would not significantly impact the surrounding noise environment. Operational noise would not be above typical ambient levels in the surrounding area.	Alternative 2 would result in temporary construction noise that would not significantly impact the surrounding noise environment. Operational noise would not be above typical ambient levels in the surrounding area.	Alternative 3 would result in temporary construction noise that would not significantly impact the surrounding noise environment. Operational noise would not be above typical ambient levels in the surrounding area.	Ambient noise would remain unchanged from baseline conditions.
Waste, Hazardous Materials, and Stored Fuels	The Proposed Action would not generate significant quantities of hazardous wastes or materials during construction or operation. Incorporation of maintenance and monitoring during operation would reduce the likelihood of accidental releases of hazardous substances.	Alternative 2 would not generate significant quantities of hazardous wastes or materials during construction or operation. Incorporation of maintenance and monitoring during operation would reduce the likelihood of accidental releases of hazardous substances.	Alternative 3 would not generate significant quantities of hazardous wastes or materials during construction or operation. Incorporation of maintenance and monitoring during operation would reduce the likelihood of accidental releases of hazardous substances.	The quantity of hazardous wastes and materials generated, and the likelihood of accidental releases, would remain unchanged from baseline conditions.
Water Resources	The Proposed Action would temporarily disturb surface waters in the project footprint during construction. Project construction would result in the loss of approximately 0.017 acre of surface waters. Installation of a culvert would minimize changes to existing hydrology. The USAF would also purchase conservation credits at a U.S. Fish and Wildlife Service (USFWS)-approved mitigation bank in Solano County to offset potential impacts to the special-status plant species Contra Costa goldfields (*Lasthenia conjugens*). All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring contours and revegetating with native plant species.	Alternative 2 would temporarily disturb surface waters in the project footprint during construction. Project construction would result in the loss of approximately 0.017 acre of surface waters. Installation of a culvert would minimize changes to existing hydrology. The USAF would also purchase conservation credits at a USFWS-approved mitigation bank in Solano County to offset potential impacts to Contra Costa goldfields. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring contours and revegetating with native plant species.	Alternative 3 would temporarily disturb surface waters in the project footprint during construction. Alternative 3 would result in the loss of approximately 0.3 acre of wetlands and other surface waters. Installation of culverts and other measures to maintain existing hydrology would localize impacts to the project footprint, and the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County to offset potential impacts to Contra Costa goldfields. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring contours and revegetating with native plant species.	Water resources would remain unchanged from baseline conditions.

Table ES-1 Summary of Environmental Impacts for Alternative 1 (Proposed Action), Alternative 2, Alternative 3, and the No-Action Alternative (Cont.)

Resource	Alternative 1 (Proposed Action)	Alternative 2	Alternative 3	No-Action Alternative
Biological Resources	The Proposed Action would temporarily disturb potentially suitable habitat for special-status invertebrate species in the project footprint during construction. The USFWS issued a *Biological Opinion* (BO) in October 2009 stating that the Proposed Action would not likely jeopardize Contra Costa goldfields or other special-status species. The BO additionally noted that the loss of approximately 0.017 acre of surface waters due to project construction would potentially impact Contra Costa goldfields. To offset potential impacts, the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring contours and revegetating with native plant species.	Alternative 2 would temporarily disturb potentially suitable habitat for special-status invertebrate species in the project footprint during construction. Under Alternative 2, the loss of approximately 0.017 acre of surface waters due to project construction would potentially impact Contra Costa goldfields. To offset potential impacts, the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring contours and revegetating with native plant species.	During project construction, Alternative 3 would temporarily disturb potentially suitable habitat for special-status invertebrate species and vernal pools containing Contra Costa goldfields. Alternative 3 would result in the loss of approximately 0.093 acre of vernal pools containing Contra Costa goldfields, an additional approximately 0.19 acre of vernal pools containing potentially suitable special-status invertebrate species habitat, and an additional approximately 0.017 acre of surface waters. To offset potential impacts, the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring contours and revegetating with native plant species.	Biological resources would remain unchanged from baseline conditions. No impacts to special-status species or potentially suitable habitat would result.
Socioeconomics	Economic activity generated from the Proposed Action would be negligible on a regional scale and would not impact socioeconomic resources.	Economic activity generated from Alternative 2 would be negligible on a regional scale and would not impact socioeconomic resources.	Economic activity generated from Alternative 3 would be negligible on a regional scale and would not impact socioeconomic resources.	Socioeconomic conditions would remain the same as baseline conditions.
Cultural Resources	The area of potential effect (APE) associated with the Proposed Action was previously surveyed, and no *National Register of Historic Places* (NRHP)-eligible cultural resources were identified. The decommissioned rail spur was determined to be not eligible for NRHP listing. The California State Historic Preservation Office (SHPO) concurred with a finding of "No Historic Properties Affected" for the Proposed Action. Therefore, the Proposed Action would not impact cultural resources.	The APE associated with Alternative 2 was previously surveyed, and no NRHP-eligible cultural resources were identified. The decommissioned rail spur was determined to be not eligible for NRHP listing. The California SHPO additionally concurred with a finding of "No Historic Properties Affected" for Alternative 2. Therefore, Alternative 2 would not impact cultural resources.	The APE associated with Alternative 3 was previously surveyed, and no NRHP-eligible cultural resources were identified. The decommissioned rail spur was determined to be not eligible for NRHP listing. The California SHPO additionally concurred with a finding of "No Historic Properties Affected" for Alternative 3. Therefore, Alternative 3 would not impact cultural resources.	Cultural resources would remain unchanged from baseline conditions.

Table ES-1 Summary of Environmental Impacts for Alternative 1 (Proposed Action), Alternative 2, Alternative 3, and the No-Action Alternative (Cont.)

Resource	Alternative 1 (Proposed Action)	Alternative 2	Alternative 3	No-Action Alternative
Land Use	All project components under the Proposed Action would be sited to enhance the operational efficiency of Travis AFB while remaining compatible with existing on- and off-base land use.	All project components under Alternative 2 would be sited to enhance the operational efficiency of Travis AFB while remaining compatible with existing on- and off-base land use.	All project components under Alternative 3 would be sited to enhance the operational efficiency of Travis AFB while remaining compatible with existing on- and off-base land use.	Existing land use would remain unchanged from baseline conditions.
Transportation Systems	Neither construction activities nor project operations under the Proposed Action would substantially increase traffic volumes above baseline levels.	Neither construction activities nor project operations under Alternative 2 would substantially increase traffic volumes above baseline levels.	Neither short-term construction activities nor long-term project operations under Alternative 3 would substantially increase traffic volumes above baseline levels.	Traffic volumes would remain unchanged from baseline conditions.
Safety and Occupational Health	The siting, construction, and operation of project components under the Proposed Action would comply with all applicable safety and occupational health standards. Potential human health hazards from low levels of surface soil contamination in part of the project footprint would be addressed in a *Health and Safety Plan*.	The siting, construction, and operation of project components would under Alternative 2 comply with all applicable safety and occupational health standards. Potential human health hazards from low levels of surface soil contamination in part of the project footprint would be addressed in a *Health and Safety Plan*.	The siting, construction, and operation of project components would under Alternative 3 comply with all applicable safety and occupational health standards. Potential human health hazards from low levels of surface soil contamination in part of the project footprint would be addressed in a *Health and Safety Plan*.	Conditions related to safety and occupational health would remain unchanged from baseline conditions.
Environmental Management	The Proposed Action would be consistent with established pollution prevention directives. Construction-related impacts to soils would be temporary, and all impacted areas would be restored to pre-construction condition upon project completion. Debris removal at the *Landfill X* Environmental Restoration Program (ERP) Site would follow a *Site Characterization and Disposal Plan*, and all activities at the *Landfill X* site would meet legal requirements established in a 2002 U.S. Environmental Protection Agency (USEPA) *Record of Decision* (ROD).	Alternative 2 would be consistent with established pollution prevention directives. Construction-related impacts to soils would be temporary, and all impacted areas would be restored to pre-construction condition upon project completion. Debris removal at the *Landfill X* ERP Site would follow a *Site Characterization and Disposal Plan*, and all activities at the *Landfill X* site would meet legal requirements established in a 2002 USEPA *ROD*.	Alternative 3 would be consistent with established pollution prevention directives. Construction-related impacts to soils would be temporary, and all impacted areas would be restored to pre-construction condition upon project completion. Debris removal at the *Landfill X* ERP Site would follow a *Site Characterization and Disposal Plan*, and all activities at the *Landfill X* site would meet legal requirements established in a 2002 USEPA *ROD*.	Conditions related to environmental management would remain unchanged from baseline conditions.
Environmental Justice	Activities associated with the Proposed Action would not result in significant adverse impacts to environmental justice populations or significant adverse health and safety risks to children.	Activities associated with Alternative 2 would not result in significant adverse impacts to environmental justice populations or significant adverse health and safety risks to children.	Activities associated with Alternative 3 would not result in significant adverse impacts to environmental justice populations or significant adverse health and safety risks to children.	Conditions related to environmental justice would remain unchanged from baseline conditions.

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FOR THE OUTGRANT OF REAL ESTATE AND CONSTRUCTION
OF A JP-8 PIPELINE AND RECEIVING FACILITY AT TRAVIS AFB

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AAFES	Army/Air Force Exchange Service
ACHP	Advisory Council on Historic Preservation
ADT	average daily traffic
AEI	Air Emissions Inventory
AFB	Air Force Base
AFI	Air Force Instruction
AFM	Air Force Manual
AFP	Appropriated Fund Personnel
AGE	aerospace ground equipment
AIRFA	American Indian Religious Freedom Act
ALUC	Airport Land Use Commission
AMC	Air Mobility Command
AMEC	AMEC Earth & Environmental, Inc.
AMW	Air Mobility Wing
APCD	Air Pollution Control District
APE	area of potential effect
APS	Aerial Port Squadron
APSA	Aboveground Petroleum Storage Act
AQCR	Air Quality Control Region
AST	aboveground storage tank
AT/FP	Anti-Terrorism/Force Protection
ATW	Air Transport Wing
avgas	aviation gasoline
BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
BBL	barrel(s)
BEA	U.S. Bureau of Economic Analysis
bgs	below ground surface
Bldg.	building
BLS	U.S. Bureau of Labor Statistics
BMP	Best-Management Practice(s)
BO	Biological Opinion
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Cal/EPA	California Environmental Protection Agency
CalTrans	California Department of Transportation
CARB	California Air Resources Board
CDE	California Department of Education
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CES	Civil Engineering Squadron
CESA	California Endangered Species Act
CFC	chlorofluorocarbon(s)
CFR	Code of Federal Regulations
CH_4	methane
CI	Corrosion Inhibitor

LIST OF ACRONYMS AND ABBREVIATIONS (Cont.)

CNDDB	California Natural Diversity Database
CNEL	community noise exposure level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
CY	calendar year
dB	decibel(s)
dBA	A-weighted decibel(s)
DGMC	David Grant Medical Center
DNL	day-night sound level
DoD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DWR	California Department of Water Resources
EA	Environmental Assessment
EDC	Economic Development Corporation
EIAP	Environmental Impact Analysis Process
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIRM	Flood Insurance Rate Map
FSII	Fuel System Icing Inhibitor
FSUSD	Fairfield-Suisun Unified School District
FY	financial year
gal	gallon(s)
GHG	greenhouse gas(es)
GSA	Geological Society of America
H_2S	hydrogen sulfide
HAP	Hazardous Air Pollutant(s)
HAZMART	Hazardous Material Control Center
HDD	horizontal directional drilling
HDPE	high-density polyethylene
HFC	hydrochlorofluorocarbon(s)
HQ AMC	Headquarters/Air Mobility Command
HSC	California Health and Safety Code
HWAS	Hazardous Waste Accumulation Site
HWGP	Hazardous Waste Generation Point
HWMP	Hazardous Waste Management Plan
HWSF	Hazardous Waste Storage Facility
I-	Interstate
ICP	Integrated Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan

LIST OF ACRONYMS AND ABBREVIATIONS (Cont.)

IREP	Inventory of Rare and Endangered Plants
IRP	Installation Restoration Program
JP-8	jet fuel
KMEP	Kinder Morgan Energy Partners
lb	pound(s)
LOS	level of service
LUCP	Land Use Compatibility Plan
MAC	Military Airlift Command
MACT	Maximum Achievable Control Technology
MATS	Military Air Transport Service
MAW	Military Airlift Wing
MBTA	Migratory Bird Treaty Act
msl	mean sea level
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAF	Non-Appropriated Fund
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NEWIOU	North/East/West Industrial Operable Unit
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NOA	Notice of Availability
NRHP	National Register of Historic Places
NRMU	Natural Resource Management Unit
O_3	ozone
OWS	oil/water separator
P2 MAP	Pollution Prevention Management Action Plan
Pb	lead
PFC	perfluorocarbon(s)
PHMSA	Pipeline and Hazardous Materials Safety Administration
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POC	precursor organic compound(s)
POL	petroleum, oil, and lubricants
ppm	parts per million
QD	quantity-distance
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RI	Remedial Investigation
ROG	reactive organic gas(ses)
ROW	right-of-way
RWQCB	Regional Water Quality Control Board
SAC	Strategic Air Command
SCADA	Supervisory Control and Data Acquisition
SDA	Static Discharge Additive

LIST OF ACRONYMS AND ABBREVIATIONS (Cont.)

SF_6	sulfur hexafluoride
SFBAAB	San Francisco Bay Area Air Basin
SFPP	SFPP, LP
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCCP	Spill Prevention, Control and Countermeasures Plan
SPRR	Southern Pacific Railroad
SR-	California State Route
STA	Solano Transit Authority
SVOC	semi-volatile organic compound(s)
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TIS	Traffic Impact Study
tpy	tons per year
TSDF	Treatment Storage and Disposal Facility
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
USCCSP	U.S. Climate Change Science Program
USD	Unified School District
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
UST	underground storage tank
VOC	volatile organic compound(s)
VRP	visibility-reducing particle(s)
WABOU	West/Annexes/Basewide Operable Unit
WWII	World War II

SECTION 1
PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

Travis Air Force Base (AFB) proposes to outgrant real estate on Travis AFB via easement and right-of-way (ROW) to SFPP, L.P. (SFPP), upon which SFPP would install, own, operate, and maintain a jet fuel (JP-8) pipeline, receiving facility, and associated ancillary equipment. SFPP would tie the proposed project components into an existing SFPP-owned pipeline and facilities and U.S. Air Force (USAF)-owned petroleum, oils, and lubricants (POL) facilities at Travis AFB. The proposed real estate outgrant and construction would greatly enhance Travis AFB's existing USAF-owned JP-8 distribution and dispensation infrastructure for its Air Mobility Command (AMC) missions. SFPP is an operating partner for Kinder Morgan Energy Partners, L.P. (KMEP), the largest independent transporter of refined petroleum products in North America. Through the KMEP partnership, SFPP delivers petroleum products to locations throughout northern California and western Nevada via the approximately 865-mile *North Line* pipeline system.

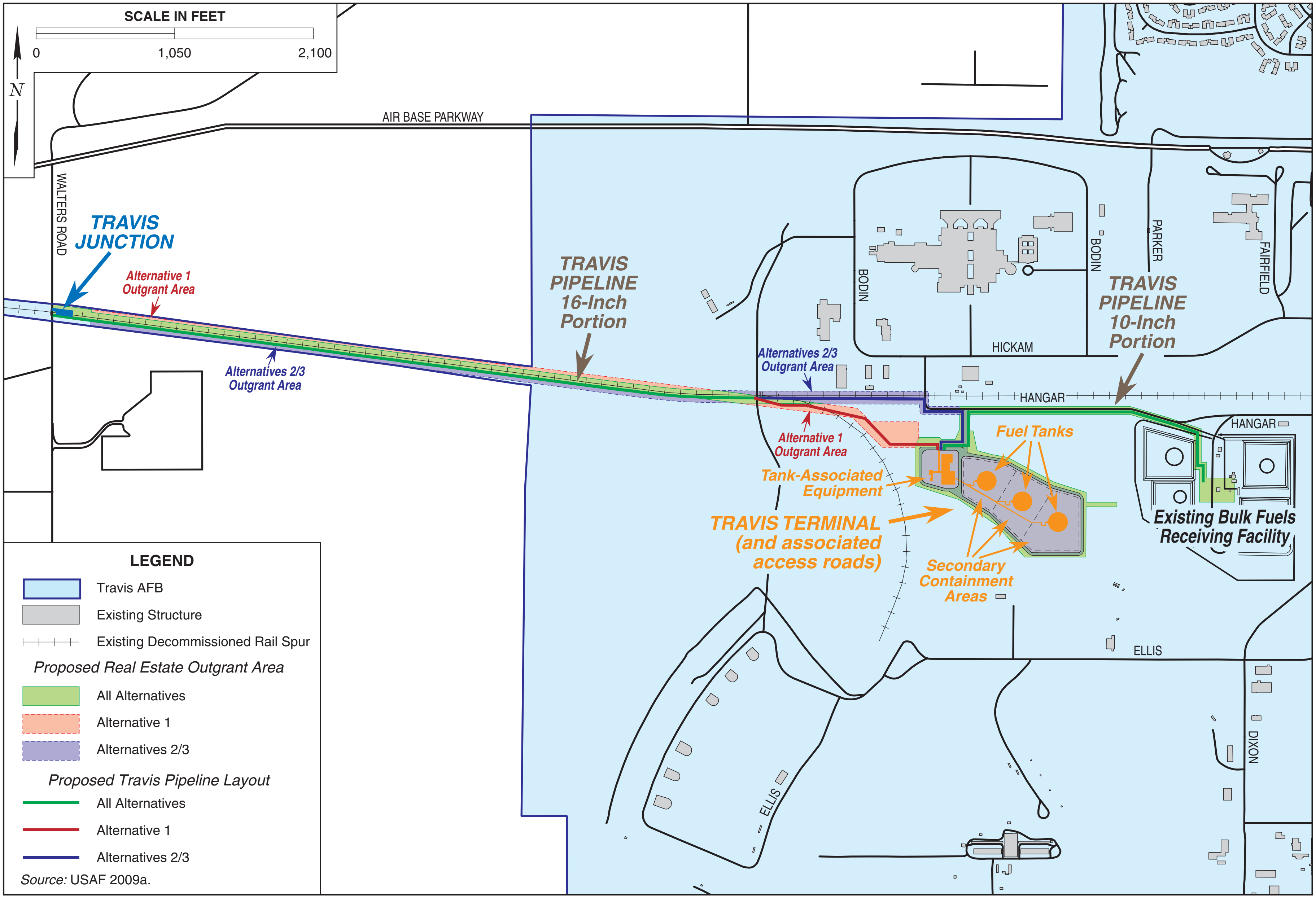
The Proposed Action to be addressed in this Environmental Assessment (EA) is the outgrant of real estate to SFPP for the purposes of SFPP installing, owning, operating, and maintaining a JP-8 pipeline, receiving facility, and associated ancillary equipment located not only on Travis AFB easement and ROW, but also on SFPP-owned property, including:

- a tie-in station to facilitate access to existing fuel storage and pumping capabilities at a SFPP-owned and operated JP-8 storage facility (*Concord Station*) located near the City of Concord, approximately 20 miles south of Travis AFB;
- a junction station (*Travis Junction*), located at the western edge of Travis AFB, to access a multi-product petroleum pipeline which runs from Concord to Sacramento (*Concord-to-Sacramento Pipeline*);
- a pipeline (*Travis Pipeline*), approximately 1.9 miles in length, including a 1.4-mile 16-inch pipeline located along an existing decommissioned rail spur within Travis AFB connecting the proposed junction station and receiving facility, and a 0.5-mile 10-inch pipeline located along Hangar Avenue connecting the proposed receiving facility to the existing Travis AFB *Bulk Fuels Receiving Facility*; and,
- an on-base JP-8 receiving facility (*Travis Terminal*), located west of the existing bulk fuels receiving facility, with three 150,000-barrel (BBL) JP-8 breakout tanks and associated equipment (including secondary containment). The Travis Terminal would be unmanned. Monitoring and control would be conducted remotely from the Concord Station.

1.1.1 Location

The real estate on Travis AFB proposed for outgrant as part of the Proposed Action is located in the western part of the base (Figure 1-1). The Travis Terminal would be

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



EA

Overview of the Proposed Real Estate Outgrant Area and Location of Proposed Project Components Travis Air Force Base

FIGURE 1-1

located approximately 0.5 mile west of the existing Travis AFB *Bulk Fuels Receiving Facility*, south of Hangar Way. The Travis Pipeline would be located along an existing decommissioned rail spur, running west from the existing bulk fuels receiving facility, passing north of the Travis Terminal footprint, and continuing to the western boundary of the base. The Travis Junction would be located at the western edge of the base near Walters Road. In addition to the leased premises on Travis AFB, ancillary equipment would be installed at the Concord Station, located near the City of Concord (Figure 1-2).

1.1.1.1 Travis AFB

Travis AFB is located approximately 3 miles east of the Central Business District of the City of Fairfield along the Interstate (I-) 80 corridor, approximately 35 miles southwest of Sacramento and approximately 45 miles northeast of San Francisco (Figure 1-2). The base encompasses approximately 6,400 acres and is home to approximately 7,250 active duty personnel, 4,250 reservists, and 3,750 civilians. The base is also home to the David Grant Medical Center (DGMC), a 265-bed hospital and teaching facility.

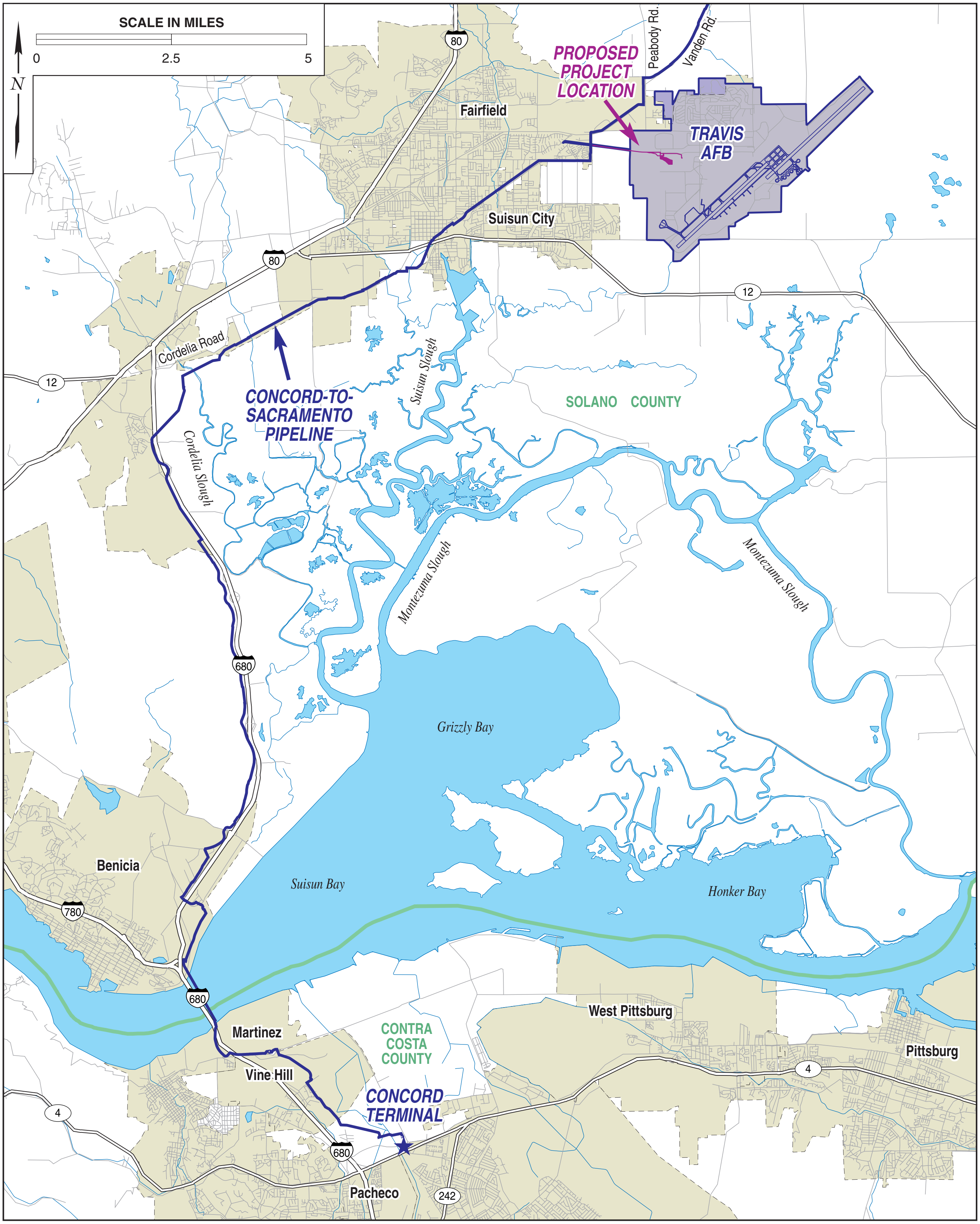
Travis AFB's mission is to provide rapid, responsive, reliable airlift of forces to any worldwide location to fulfill the global logistics needs of the U.S. Department of Defense (DoD). The base is home to the largest AMC organization in the USAF, the 60th Air Mobility Wing (AMW), whose mission is to deliver unrivaled strategic airlift and air refueling operations throughout the world.

1.1.1.2 SFPP, LP

SFPP is an operating partner for KMEP, the largest independent transporter of refined petroleum products in North America. KMEP transports over 2 million BBL of petroleum products per day through more than 8,000 miles of pipelines. SFPP's pipeline system is part of KMEP's *Pacific Operations* unit, a network of over 3,000 miles of pipelines which serve California, Oregon, and the Southwest. The approximately 865-mile SFPP *North Line* pipeline system delivers petroleum products from San Francisco Bay Area refineries to terminals in Brisbane, San Jose, Sacramento, Stockton, Fresno, and Reno, Nevada.

1.1.1.3 Concord-to-Sacramento Pipeline

The 70-mile Concord-to-Sacramento Pipeline (Figure 1-2) is part of the SFPP North Line system. The pipeline transports petroleum products northeast from the Concord Station along the I-680 and I-80 corridors, passing just outside of the western boundary of Travis AFB, and continuing to Sacramento. The pipeline was improved in 2004 by replacing a previous 14-inch diameter pipeline with one that is 20 inches in diameter, and by rerouting the pipeline to avoid sensitive natural resources and areas of residential development. The pipeline's capacity is approximately 175,000 BBL per day, with the potential to expand to 200,000 BBL per day. Current flow rates on the pipeline average 7,400 BBL per hour when active. The pipeline is owned, operated, and maintained by SFPP.



EA

Concord Terminal, Concord-to-Sacramento Pipeline, and Proposed Project Location in the Vicinity of Travis Air Force Base

FIGURE 1-2

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

1.1.1.4 Concord Station

The Concord Station is a petroleum storage and distribution terminal located approximately 1 mile north of the Central Business District of the City of Concord and approximately 1 mile west of the Concord Naval Weapons Station (refer to Figure 1-2). It is located in an area containing predominantly industrial land uses, including petroleum storage and warehousing. The station encompasses approximately 25 acres and contains 23 tanks with a total capacity of 1,187,730 BBL. Within the station, two JP-8 tanks are in operation, both of which are presently able to ship fuel to Travis AFB. The station is owned, operated, and maintained by SFPP.

1.2 NEED FOR THE PROPOSED ACTION

As outlined previously, the mission at Travis AFB is to provide rapid, responsive, reliable airlift of forces to any worldwide location to fulfill the global logistics needs of the DoD. The 60th AMW operates three types of aircraft, all of which are based at Travis AFB: USAF C-17s, C-6s, and KC-10s. 60th AMW activities are augmented by the operation of U.S. Navy E-6s and U.S. Coast Guard C-130s, as well as transient aircraft.

In summary, the *need* for the Proposed Action is driven by an identified shortfall in the existing JP-8 distribution and dispensation infrastructure at Travis AFB; further, the fuel-distribution system on which the base currently relies is nearing capacity. Project implementation would enhance the ability of the base's personnel to maintain and operate base-assigned and other aircraft by increasing fuel storage and transport capacities, and would ensure that affected systems are consistent with modern environmental and safety standards.

1.3 OBJECTIVES OF THE PROPOSED ACTION

The *objectives* of the Proposed Action are to improve Travis AFB's access to SFPP's recently modernized fuel distribution network and to improve the base's existing fuel distribution network, including an increase in capacity of both on-base pipeline distribution and fuel tank storage. Achieving this increase in capacity would facilitate more rapid and responsive fuel distribution to accommodate current and anticipated future levels of aircraft operations at Travis AFB. The action would also allow Travis AFB to discontinue use of approximately 7 miles of older USAF-owned and operated off-base pipeline.

1.4 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA considers multiple alternatives, including the Proposed Action and the No-Action Alternative. The EA identifies, evaluates, and documents the environmental impacts anticipated to result from implementation of each considered alternative. Existing resource conditions at the project site are described in Section 3, *Affected Environment*. Along with information presented for the No-Action Alternative, these

conditions comprise the baseline against which potential effects of each alternative are assessed. Section 3 presents baseline information on resources potentially impacted by implementation of the Proposed Action or a project alternative. Resources for which analyses will be conducted include:

- Air Quality
- Noise
- Wastes, Hazardous Materials, and Stored Fuels
- Water Resources
- Biological Resources
- Socioeconomic Resources
- Cultural Resources
- Land Use
- Transportation Systems
- Safety and Occupational Health
- Environmental Management
- Environmental Justice

Potential environmental impacts of the Proposed Action and each alternative are described in Section 4, *Environmental Consequences*. This analysis includes *direct* impacts (those caused by an action and occurring at the same time and location); *indirect* impacts (those caused by an action but occurring later or in a physically disconnected location, but within a reasonably foreseeable time or geographic area); and, any *cumulative* impacts of the action when considered in the context of other past, present, and reasonably foreseeable future actions, regardless of whether they are Federal or non-Federal. Mitigation measures and/or Best-Management Practices (BMPs) that could reduce identified impacts will be identified where appropriate.

1.5 DECISIONS THAT MUST BE MADE

The *purpose* of and *need* for the Proposed Action have been demonstrated and are well documented. Important decisions that must be made before project implementation can commence include the identification of any mitigation measures or BMPs that may be necessary to avoid or minimize impacts to identified sensitive natural resources (including vernal pools and potentially suitable special-status species habitat). These decisions, which may ultimately involve modifying design details to further reduce impacts, will ensure that the action is implemented in a way such that all project objectives are accomplished while simultaneously allowing the USAF to continue to achieve its environmental stewardship mission.

1.6 APPLICABLE REGULATORY REQUIREMENTS AND REQUIRED COORDINATION

The Environmental Impact Analysis Process (EIAP) is the process by which the USAF facilitates compliance with environmental regulations. The primary legislation affecting these agencies′ decision-making process is the National Environmental Policy Act (NEPA) of 1969. This act and other facets of the EIAP are described below.

1.6.1 National Environmental Policy Act

In accordance with NEPA, Federal agencies are required to take into consideration potential environmental consequences of proposed actions in their decision-making process. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee Federal policy in this process. The CEQ subsequently issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] § 1500-1508). These regulations specify that an EA be prepared to:

- briefly provide sufficient analysis and evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a finding of no significant impact;
- aid in an agency's compliance with NEPA when no EIS is necessary; and,
- facilitate preparation of an EIS when one is necessary.

To comply with NEPA and other pertinent environmental requirements, such as the Endangered Species Act (ESA) and the National Historic Preservation Act (NHPA), and to assess impacts on the environment, the decision-making process includes a study of baseline environmental conditions and an analysis of the potential impacts on these conditions that may result upon implementation of a proposed action. The USAF's regulatory requirements with respect to NEPA are promulgated at 32 CFR §§ 989 *et seq*.

1.6.2 Interagency and Intergovernmental Coordination for Environmental Planning

Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) is a Federally-mandated process for informing and coordinating with other governmental agencies regarding proposed actions. As detailed in 40 CFR § 1501.4(b), CEQ regulations require intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the IICEP process, the USAF will notify relevant Federal, state, and local agencies and allow them sufficient time to make known their environmental concerns specific to a proposed action. Comments and concerns submitted by these agencies during the IICEP process are subsequently incorporated into the analysis of potential environmental impacts conducted as part of the EA.

1.6.3 Endangered Species Act

The ESA of 1973 (16 U.S. Code [USC] §§ 1531-1544, as amended) established measures for the protection of plant and animal species that are Federally- listed as threatened and endangered, and for the conservation of habitats that are critical to the continued existence of those species. Federal agencies must evaluate the effects of their proposed actions through a set of defined procedures, which can include the preparation of a Biological Assessment (BA) and can require formal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the ESA and preparation of a Biological Opinion (BO). Habitat conservation and protected species management at Travis AFB is directed by the base's *Integrated Natural Resources Management Plan* (INRMP).

1.6.4 Clean Air Act and Conformity Requirements

The Clean Air Act (CAA) (42 USC §§ 7401-7671, as amended) provided the authority for the U.S. Environmental Protection Agency (USEPA) to establish nationwide air quality standards to protect public health and welfare. Federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for six criteria pollutants: ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, particulate matter, and lead. The Act also requires that each state prepare a State Implementation Plan (SIP) for maintaining and improving air quality and eliminating violations of the NAAQS. Under the CAA Amendments of 1990, Federal agencies are required to determine whether their undertakings are in conformance with the applicable SIP and demonstrate that their actions will not cause or contribute to a new violation of the NAAQS; increase the frequency or severity of any existing violation; or delay timely attainment of any standard, emission reduction, or milestone contained in the SIP. The USEPA has set forth regulations 40 CFR § 51, Subpart W, that require the proponent of a proposed action to perform an analysis to determine if its implementation would conform to the SIP.

1.6.5 Water Resources Regulatory Requirements

The Clean Water Act (CWA) of 1977 (33 USC §§ 1251 *et seq.*) regulates pollutant discharges that could affect aquatic life forms or human health and safety. The CWA and the *Comprehensive Environmental Response, Compensation and Liability Act* of 1980 (CERCLA) (42 USC §§ 9621-9628, as amended) requires Federal agencies to develop management plans for emergency response to spills of oil and hazardous substances for which they are responsible. Executive Order (EO) 11990, *Protection of Wetlands*, regulate development activities in or near streams or wetlands. Section 404 of the CWA also regulates development in streams and wetlands and requires a permit from the U.S. Army Corps of Engineers (USACE) for dredging and filling in waters of the United States. EO 11988, *Floodplain Management*, requires Federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served

by floodplains. Federal agencies are directed to consider the proximity of their actions to or within floodplains.

1.6.6 Cultural Resources Regulatory Requirements

The NHPA of 1966 (16 USC § 470) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP) which outlined procedures for the management of cultural resources on Federal property. Cultural resources can include archaeological remains, architectural structures, and traditional cultural properties such as ancestral settlements, historic trails, and places where significant historic events occurred. NHPA requires Federal agencies to consider potential impacts to cultural resources that are listed, nominated to, or eligible for listing on the NRHP; designated a National Historic Landmark; or valued by modern Native Americans for maintaining their traditional culture. Section 106 of NHPA requires Federal agencies to consult with the appropriate State Historic Preservation Office (SHPO) if their undertaking might affect such resources. *Protection of Historic and Cultural Properties* (36 CFR § 800 [1986]) provided an explicit set of procedures for Federal agencies to meet their obligations under the NHPA, which includes inventorying of resources and consultation with SHPO. Cultural resources management at Travis AFB is directed by the base's *Integrated Cultural Resources Management Plan* (ICRMP).

EO 13007, *Indian Sacred Sites*, directs Federal land (any land or interests in land owned by the U.S., including leasehold interests held by the U.S., except Indian trust lands) managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites (any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe [an Indian or Alaska Native tribe, band, nation, Pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian tribe pursuant to Public Law (PL) No. 103-454, 108 Statute 4791, an "Indian" refers to a member of such an Indian tribe] or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion) provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site.

The American Indian Religious Freedom Act (AIRFA) (42 USC § 1996) established Federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites. The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC §§ 3001-3013) requires consultation with Native American Tribes prior to excavation or removal of human remains and certain objects of cultural importance.

1.6.7 Property Outgrant Regulatory Requirements

Air Force Instruction (AFI) 32-9003, *Granting Temporary Use of Air Force Real Property*, explains the policies, procedures, and responsible agencies and parties involved in the outgrant of USAF property. AFI 32-0766, *Environmental Baseline Surveys in Real Estate Transactions*, outlines procedures for the evaluation and reporting of potential environmental compliance and liability issues prior to the outgrant or transfer of USAF property.

1.6.8 Other Executive Orders

Additional regulatory legislation that potentially applies to the implementation of this action includes guidelines promulgated by EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to ensure that citizens in either of these categories are not disproportionately affected. Additionally, potential health and safety impacts that could disproportionately affect children are considered under guidelines established by EO 13045, *Protection of Children from Environmental Health and Safety Risks*.

1.6.9 Summary of Primary Required Coordination

The Proposed Action would be implemented only after applicable regulatory agencies have been consulted and required permits have been obtained; consultation and permitting through these agencies may result in changes to the mitigation measures proposed in this document. Implementation of the Proposed Action would require and involve coordination with the following agencies:

- USFWS under Section 7 of the ESA;
- USACE under Section 404 of the CWA;
- California State Water Resources Control Board (SWRCB) under Section 401 of the CWA;
- California SHPO under Section 106 of the NHPA;
- Bay Area Air Quality Management District (BAAQMD) under the CAA;
- U.S. Department of Transportation (DOT) for pipeline safety; and,
- State of California Division of Occupational Safety and Health for fuel handling and transport.

SECTION 2
DESCRIPTION OF ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

Travis AFB proposes to outgrant real estate on Travis AFB via easement and ROW to SFPP, upon which SFPP would install, own, operate, and maintain a JP-8 pipeline, receiving facility, and associated ancillary equipment. SFPP would tie the proposed project components into an existing SFPP-owned pipeline and facilities and USAF-owned POL facilities at Travis AFB. The Proposed Action would greatly enhance Travis AFB's existing USAF-owned JP-8 distribution and dispensation infrastructure for its AMC missions. SFPP's installation, operation, and maintenance of these new POL components would comply with DoD Unified Facilities Criteria (UFC) 3-460-01, *Petroleum Fuel Facilities*, other pertinent Federal and state regulations, and the terms and conditions of its outgrant of real estate with the USAF.

2.2 SELECTION CRITERIA FOR ALTERNATIVES

During the outgrant site selection process, several alternatives were considered, as further discussed in Section 2.4 below. The primary criteria applied in identifying the Preferred Alternative included:

- The ability to tie into existing primary supply pipeline in close proximity to the proposed terminal within Travis AFB.
- The ability to provide protection and emergency response by locating facilities within Travis AFB property boundaries.
- The proximity to existing POL facilities at Travis AFB.
- The availability of necessary infrastructure (e.g., access roads) and utilities.
- The potential for avoidance or reduction of impacts to identified sensitive natural resources (including vernal pools and potentially suitable special-status species habitat).

2.3 PIPELINE CONSTRUCTION, OPERATION, AND MAINTENANCE OVERVIEW

Pipeline ROW preparation and construction techniques would vary depending on the selected alternative. Techniques that would be incorporated into one or more of the project alternatives are summarized below, and detailed descriptions of each alternative are presented in Section 2.5. Pipeline operation, maintenance, and emergency response procedures would be common to all alternatives. Those common project elements are also summarized below.

2.3.1 Pipeline Construction

Pipeline ROW preparation and construction would vary depending on the project alternative and may be comprised of one or more of the following techniques: *conventional trenching*, *horizontal directional drilling* (HDD), and/or *slick-bore*. Each of these techniques is further described below, and their proposed incorporation into each alternative is described in Section 2.5.

All of the proposed construction techniques would be subject to BMPs that would address potential impacts along the pipeline footprint related to the storage, use, and maintenance of construction-related equipment. During all phases of pipeline construction, refueling and lubrication of equipment would occur off-site at the construction contractors' staging yard or on-site in a designated and closely monitored temporary staging area. Equipment would be regularly checked for leakage, and no refueling or lubrication of equipment would occur within 250 feet of identified environmentally sensitive areas.

2.3.1.1 Conventional Trenching

Right-of-Way (ROW) Preparation

ROW preparation for conventional trenching would involve the excavation of a ditch approximately 3 feet wide by 6 feet deep for pipeline placement. The ditch would be excavated using backhoes, ditching machines, and track hoes; however, hand-digging would be used to locate buried utilities (e.g., existing pipelines, cables, and sewer lines). The use of conventional trenching and the length of trench excavated would vary depending on the selected project alternative. The pipeline would be installed in a continuous fashion from one end of the trench to the other. Activities would typically be contained within a 50- to 75-foot-wide area.

To the extent feasible, spoils—refuse material from excavation activities—would be stored onsite and returned as backfill to locations from which they were initially taken. Materials unsuitable for backfill use would be transported and disposed of in accordance with Federal, state, and local laws, regulations, and guidelines.

Pipeline Construction

Pipe-stringing trucks would be used to transport the pipe, most likely in 60- or 80-foot lengths, to the pipeline ROW. Where sufficient room exists, trucks would carry the pipe along the ROW, and sideboom tractors would unload the joints of pipe from the stringing trucks and lay them end to end beside the ditch for future line-up and welding.

Welding would be conducted to industry standards and DOT specifications. Industry standard pipeline coating would typically be applied at a qualified facility before delivery to the construction site. However, in-field coating would be applied on all weld

joints in order to provide a continuous coating along the pipeline. All coated pipe, including field joints, fittings, and bends, would be tested and repaired as necessary before backfilling.

After the pipe is installed in the ditch, backfill material would be obtained from the ditch spoils. Typically, the pipe would be covered along the sides with a maximum of 6 inches of native fill and on top with a minimum of 12 inches of native fill. The remainder of backfill in the trench would be native material excavated during trenching. At the time of backfilling, a colored warning tape would be buried from approximately 18 inches above the pipeline to the ground surface to indicate the presence of a buried pipeline to future third-party excavators. Soils in the excavated trench would be compacted relative to adjacent soils, and topsoil returned. Surface areas and natural surface drainages would be restored to pre-construction contours, accounting for trench settling, and revegetated with native plant material. Any farm roads located within the excavation footprint would also be returned to pre-construction condition.

2.3.1.2 Horizontal Directional Drilling (HDD)

HDD allows for the installation of pipelines belowground between two points without any surface disturbance along the pipeline footprint. An electronically-guided drill head cuts a pilot hole belowground between entry and exit points; a series of progressively larger reamers are then pulled in the opposite direction from the exit point through the pilot hole until the pilot hole is large enough to pull a finished pipeline to the entry point. This technique allows for the installation of pipelines below identified environmentally sensitive areas without any direct disturbance.

<u>Right-of-Way (ROW) Preparation</u>

The use of HDD requires ROW preparation areas at the drilling entry and exit points. The entry point ROW would be utilized for preparation of the pilot drill head and assembly/disassembly of the pilot piping. Equipment and activities in this area would include a drill rig unit, drilling entry point, pilot pipe assembly/ disassembly areas, and other ancillary equipment. To allow adequate space for equipment and facilitate assembly/disassembly of the pilot pipe, entry point ROW areas would typically be at least 120 feet by 75 feet.

The exit point ROW would be utilized to prepare the reamers which are pulled in the opposite direction through the pilot hole, as well as for a staging area to prepare the fabricated finished pipeline for insertion into the hole. Equipment and activities in this area would include a drilling exit point, finished pipeline preparation area, and other ancillary equipment. Exit point ROW areas would typically be at least 200 feet by 150 feet to provide sufficient space for equipment and pipeline preparation.

In addition, HDD would require a finished pipeline fabrication area located adjacent to the exit point ROW. Typically, this area would be the length of the finished pipeline and

approximately 45 feet wide to facilitate fabrication of the finished pipeline prior to insertion in to the pilot hole.

Temporary disturbance of the HDD entry and exit points and the finished pipeline fabrication area would occur for the duration of construction activities. However, where feasible these ROW areas would be located at least 250 feet from identified environmentally sensitive areas and would be restored to pre-construction conditions upon completion of drilling operations.

Pipeline Construction

After establishment of the drilling entry and exit points and the finished pipeline fabrication area, pilot piping would be transported to the entry point ROW for attachment to the electronically-guided pilot drill head. Pilot piping, most likely in 60- or 80-foot lengths, would be assembled on the drill rig and attached to the drill head until drilling of the pilot hole reached the drilling exit point.

Upon reaching the drilling exit point, a series of progressively larger reamers would be strung to the pilot piping and pulled in the opposite direction from the exit point through the pilot hole. When the size of the pilot hole is large enough for the finished pipeline, the finished pipeline would be fabricated in its entirety in the pipeline fabrication area and pulled through the pilot hole to the entry point. Pilot piping attached to the finished pipeline would be disassembled at the entry point ROW as it is pulled through the pilot hole. Upon completion of pulling the finished pipeline through the pilot hole, the drilling entry and exit points and the finished pipeline fabrication area would be restored to pre-construction conditions.

To allow for subsurface drilling and to maintain the structure of the pilot hole, pressurized drilling mud, consisting primarily of bentonite slurry, would be used for the duration of HDD construction activities. Drilling mud and other excavated solids would then be collected at the entry point as the drill pipe is pulled through the pilot hole and disassembled, and all materials would be transported and disposed of in accordance with Federal, state, and local laws, regulations, and guidelines.

The use of pressurized drilling mud has the potential to create a surface fracture ("frac-out") at locations where subsurface soils are weak and drilling mud travels to the surface. To minimize the potential for frac-out, the pilot hole path, depth, and entry and exit angles would be designed to account for soil properties in the pilot hole path, and drilling mud pressures would be continuously monitored. In the unlikely occurrence of frac-out, equipment would be located on-site for rapid containment and clean-up response, and assessment of potential impacts to identified environmentally sensitive areas would be coordinated with the appropriate regulatory agencies. Because all HDD construction activities would be restricted to the dry season (i.e., 16 April to 14 October), the likelihood of potential impacts to identified environmentally sensitive areas due to frac-out would be significantly reduced.

2.3.1.3 Slick-Bore

Slick-bore involves boring a hole and installing a temporary pipe belowground between two surface points. A finished pipeline is then pushed through the boring hole behind the temporary pipeline until the temporary pipeline is fully removed. Similar to HDD, this technique allows for the installation of pipelines below identified environmentally sensitive areas without any direct surface disturbance.

Right-of-Way (ROW) Preparation

The use of slick-bore does not necessitate the establishment of large, dedicated ROW preparation areas at the entry and exit points of the boring hole. Rather, all equipment would be contained in "bore pits" located within conventionally trenched areas adjacent to the entry and exit points, and assembly of temporary and finished pipelines would occur within ROW areas associated with these trenches. Any materials removed from the boring hole during the slick-bore process would also be stored within trench-associated ROW areas.

Temporary disturbance at bore pits near the entry and exit points would occur for the duration of construction activities, but these areas would be restored to pre-construction conditions in the manner described for conventional trenching excavation.

Pipeline Construction

After establishment of the bore pits adjacent to the entry and exit points, boring equipment would be lowered into the trench adjacent to the entry point. The boring process would simultaneously cut and remove materials from the boring hole and install a temporary pipeline the same size as the finished pipeline to stabilize the hole. The temporary pipeline would then be pushed through the boring hole by the finished pipeline until the temporary pipeline is fully removed and disassembled at the exit point. The finished pipeline would subsequently be connected to finished pipeline sections in adjacent trenches.

Assembly of the temporary and finished pipelines would occur adjacent to the boring hole entry point, while disassembly of the temporary pipeline after removal from the boring hole would occur adjacent to the exit point. Any materials removed from the boring hole would be temporarily stored adjacent to the entry point in established ROW areas, and all materials would be transported and disposed of in accordance with Federal, state, and local laws, regulations, and guidelines. Because no drilling fluids are typically used for slick-bore, there is no risk of frac-out. As with HDD, no direct surface disturbance would occur between the slick-bore entry and exit points.

2.3.2 Pipeline Operations

The facilities proposed for installation would be unmanned and operated by a computerized *Supervisory Control and Data Acquisition* (SCADA) communications and control system. The computerized SCADA system would constantly gather operational

data from critical sources throughout the system and automatically adjust the pressure and flow rate of the pipeline to provide for safe operation of the system. Additionally, pumps would be equipped with various safety devices such as pressure sensing and electrical current and temperature measuring devices to assure reliable and safe operation. The pipeline would also be protected by pressure control valves, as well as pressure measuring devices.

Leak detection systems would include equipment placed beneath the tank containment area and computerized surveillance of volumetric line balance and pressure and flow deviation within the pipeline. All shipping pumps would be equipped with maximum and minimum shut down devices that would activate in the event of a substantial pressure anomaly.

Pipeline and terminal facilities would be protected from corrosion by cathodic protection. Cathodic protection would involve the placement of anode beds at regular intervals along the pipeline route to produce an electrical current in the steel pipeline material that would counter potential iron oxidation.

2.3.3 Pipeline Maintenance

Terminal and pipeline facilities would be subject to regular inspection and maintenance activities to ensure operational integrity. These activities are required by DOT *Pipeline and Hazardous Materials Safety Administration* (PHMSA) (49 CFR § 195) regulations and would include, but would not be restricted to, the following:

- Regular inspection of the terminal and pipeline route to inspect for visible leaks and to evaluate aboveground equipment including valve stations, pump and power stations;
- Monthly inspection of cathodic protection stations to ensure the integrity of pipeline corrosion protection;
- Excavation and repair of pipeline segments experiencing coating degradation or requiring inspection to evaluate coating condition;
- Repair of valve stations and anode beds where damage is noted during regular inspection;
- Placement of additional anode beds in order to reduce pipe corrosion rates; and/or,
- Repair of pipeline anomalies identified during internal inspection or at locations damaged by third parties.

PHMSA requires internal inspections of pipelines every 5 years to check for deformation, metal loss, and other anomalies within the pipe. "Smart" pigs would be used to inspect and record the pipeline condition by detecting where corrosion or other damage may have affected the wall thickness or shape of the pipe. If a smart pig were to detect an anomaly in the pipeline, crews would be deployed to the site to excavate, evaluate the pipe, and repair the section if necessary.

2.3.4 Emergency Situations

The *California Aboveground Petroleum Storage Act* (APSA) of 2007 (California Health and Safety Code [HSC] § 25270) regulates the safety of aboveground POL storage in the State of California, including the prevention of and response to emergency situations. In January 2009, the California Environmental Protection Agency (Cal/EPA) published guidance on APSA program implementation and compliance. Cal/EPA guidance confirms that POL storage facilities regulated by the DOT (i.e., breakout facilities for interstate pipelines with no transfer into truck or rail cars) are excluded from APSA and *Spill Prevention Control and Countermeasure* regulation as defined under HSC § 25270.2(a)(6).

SFPP's proposed POL components and operations at Travis AFB would be included in SFPP's *Integrated Contingency Plan* (ICP) for emergency response activities throughout the SFPP *Pacific Operations* region. The ICP would address actions to be taken during an emergency situation and would comply with all applicable state and Federal regulations. The proposed POL components and operations at Travis AFB would be addressed in the *Northern Region, California/ Nevada, Sacramento Area* section of the ICP and integrated into the plan within 30 days of operation (per DOT and PHMSA regulation). The purpose of the ICP is to establish a predetermined mode of operation for response to any incident which could adversely impact the safe operation of the proposed facilities, including internal and external notification procedures, initial response action, description of availability of resources, and reference to facility-specific emergency response information**.**

In the event of a fire or other emergency during normal operations of the facility, response would be coordinated through Travis AFB emergency responders. SFPP's proposed POL components and operations would also be incorporated into the Travis AFB ICP to assist on-base emergency planning and response activities.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Prior to the selection of the primary site outgrant alternatives evaluated in this study, several additional siting alternatives were considered—but ultimately eliminated—due to potentially adverse environmental and logistical impacts. One alternative, installation of the pipeline along Air Base Parkway, is further discussed below.

2.4.1 Installation of the Pipeline along Air Base Parkway

Under this alternative, the Travis Pipeline would be installed along Air Base Parkway, approximately 0.25 mile north of the proposed pipeline footprint. The pipeline footprint would potentially run north or south of, or beneath, Air Base Parkway, or a combination of these routes. The Travis Junction would be constructed at the intersection of Air Base Parkway and Walters Road. This alternative was considered—but ultimately eliminated—due to the following potentially adverse environmental and logistical impacts:

- Installation of the pipeline would require SFPP and Travis AFB to obtain additional ROW easement from non-USAF landowners, thereby resulting in potentially adverse impacts to land use;
- Construction of the Travis Junction at the intersection of Air Base Parkway and Walters Road—not on existing Travis AFB property—would result in potentially adverse impacts to petroleum fuel facilities safety, based on potential public access and project component installation at a heavily-traveled intersection;
- Installation of the pipeline would occur immediately adjacent to and/or underneath Air Base Parkway, thereby resulting in partial closure of the base's main access road and potentially adverse impacts to traffic and transportation;
- Installation of the pipeline would occur amongst existing utilities (e.g., water, natural gas, etc.) located in the vicinity of Air Base Parkway, thereby increasing potentially adverse impacts to occupational health and safety;
- Pipeline maintenance activities would require the re-excavation of areas immediately adjacent to and/or underneath Air Base Parkway, thereby resulting in similar potentially adverse impacts as the construction phase (i.e., traffic due to partial road closures, occupational health and safety risks from potentially encountering existing utilities, etc.);
- The likelihood of third-party strike (i.e., a party unaffiliated with Travis AFB or SFPP striking and potentially damaging the pipeline during excavation or other maintenance activities) would be greatly increased due to installation of the pipeline amongst existing utilities located in the vicinity of Air Base Parkway;
- Installation of the pipeline outside of Travis AFB property would require coordination with outside agencies in the event of an emergency scenario, which is inconsistent with the selection criteria discussed in Section 2.2 above; and,
- The pipeline footprint under this alternative would increase by approximately 0.5 to 1.0 mile (based on various potential routes through Travis AFB), which is also inconsistent with selection criteria discussed in Section 2.2 above.

2.5 DESCRIPTION OF PROPOSED ALTERNATIVES

Each proposed alternative would involve the outgrant of real estate on Travis AFB via easement and ROW to SFPP, upon which SFPP would install, own, operate, and maintain a new JP-8 pipeline, receiving facility, and associated ancillary equipment to upgrade the JP-8 delivery, storage, and distribution infrastructure at Travis AFB. SFPP would tie the proposed project components into an existing SFPP-owned pipeline and facilities and USAF-owned POL facilities at Travis AFB. The precise real estate outgrant area would vary by the selected alternative, as described in Sections 2.5.2 to 2.5.4.

SFPP's proposed construction components common to all proposed alternatives would include: 1) Travis Terminal, the installation of three 150,000-BBL breakout tanks and associated equipment; 2) Travis Junction, the installation of a tie-in and maintenance facility on Travis AFB property at Walters Road to tie into the existing SFPP 20-inch Concord-to-Sacramento Pipeline; and, 3) Concord Station, the installation of a tie-in

station within the boundaries of the exiting SFPP-owned and operated Concord Station to access on-site JP-8 storage and pumping capabilities. Each of these proposed components is further described below. The Concord Station component would not involve substantial changes to the physical environment; however, a brief description is included within this summary in the interest of accurately presenting the geographic extent of each proposed alternative.

SFPP's proposed construction components would also include the approximately 1.9-mile Travis Pipeline, including an approximately 0.5-mile 10-inch pipeline located along Hangar Avenue connecting the proposed Travis Terminal to the existing Travis AFB *Bulk Fuels Receiving Facility*, and an approximately 1.4-mile 16-inch pipeline located along an existing decommissioned rail spur within Travis AFB. A majority of the pipeline route west of the proposed Travis Terminal would be located within existing ROW associated with the rail spur, an alignment that was selected in order to reduce or altogether avoid potentially significant impacts to identified sensitive natural resources (including vernal pools and potentially suitable special-status species habitat).. Construction techniques and temporary disturbance areas associated with installation of the 16-inch pipeline would vary depending on the selected alternative and are described in detail in Sections 2.5.2 to 2.5.4.

2.5.1.1 Travis Terminal

The Travis Terminal component would involve the installation of a JP-8 receiving facility west of the existing Travis AFB *Bulk Fuels Receiving Facility* on base property (Figures 2-1 to 2-3). The facility would occupy approximately 13.34 acres, and would be comprised of 11.31 acres of tank containment and equipment areas, and 2.03 acres of access and maintenance roads. Installation of the 10- and 16-inch segments of the Travis Pipeline would respectively tie the Travis Terminal into the base's existing JP-8 distribution and dispensation infrastructure and the SFPP Concord-to-Sacramento Pipeline.

The Travis Terminal would include three breakout tanks, each with a working capacity of 150,000 BBL, a finished diameter of 155 feet, and a height of 55 feet. Each tank would be constructed in a drain dry configuration with internal floating pans. To provide secondary containment, each tank would sit on a concrete ring wall foundation with a high-density polyethylene (HDPE) liner containing sand fill and an electrical grid system for cathodic protection of the tank bottom. Each tank would be placed within an individual diked or bermed area which would contain 100 percent of tank volume plus additional precipitation from a 25 year storm event. The containment area would be surrounded by a permanent access and maintenance road.

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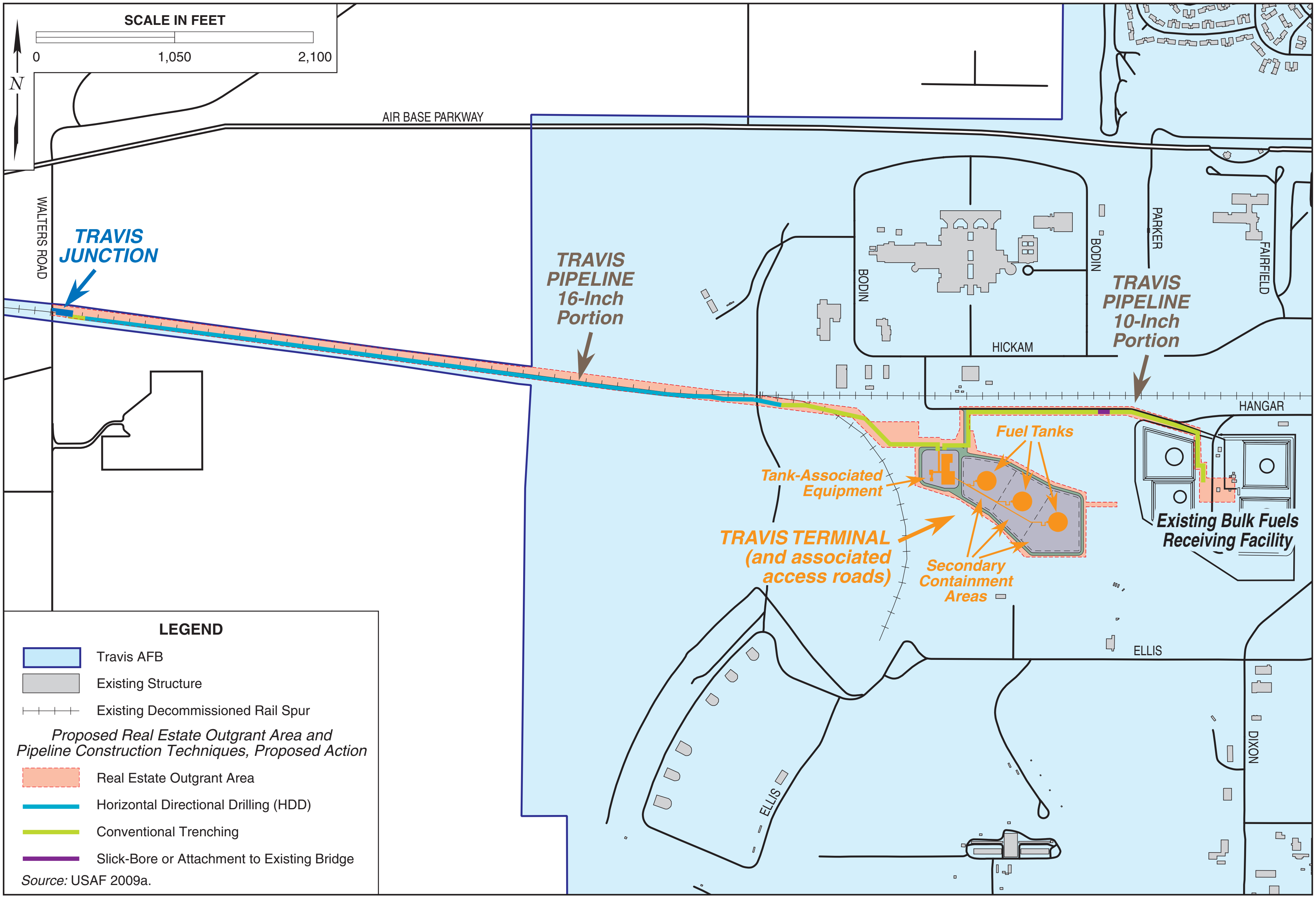

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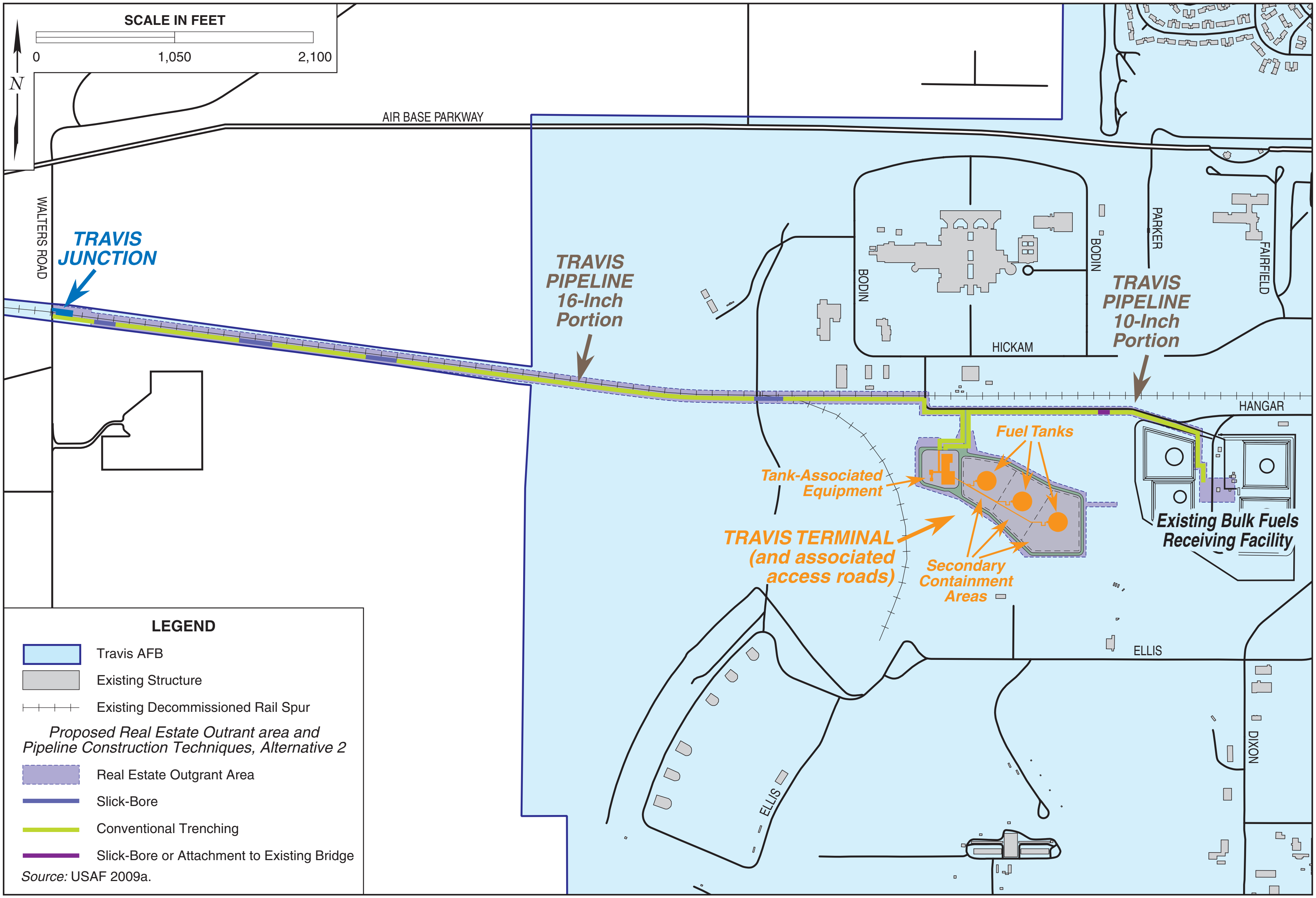
Travis Pipeline, Location and Construction Techniques under the Proposed Action Travis Air Force Base

FIGURE 2-1



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Travis Pipeline, Location and Construction Techniques under Alternative 2 Travis Air Force Base

FIGURE 2-2

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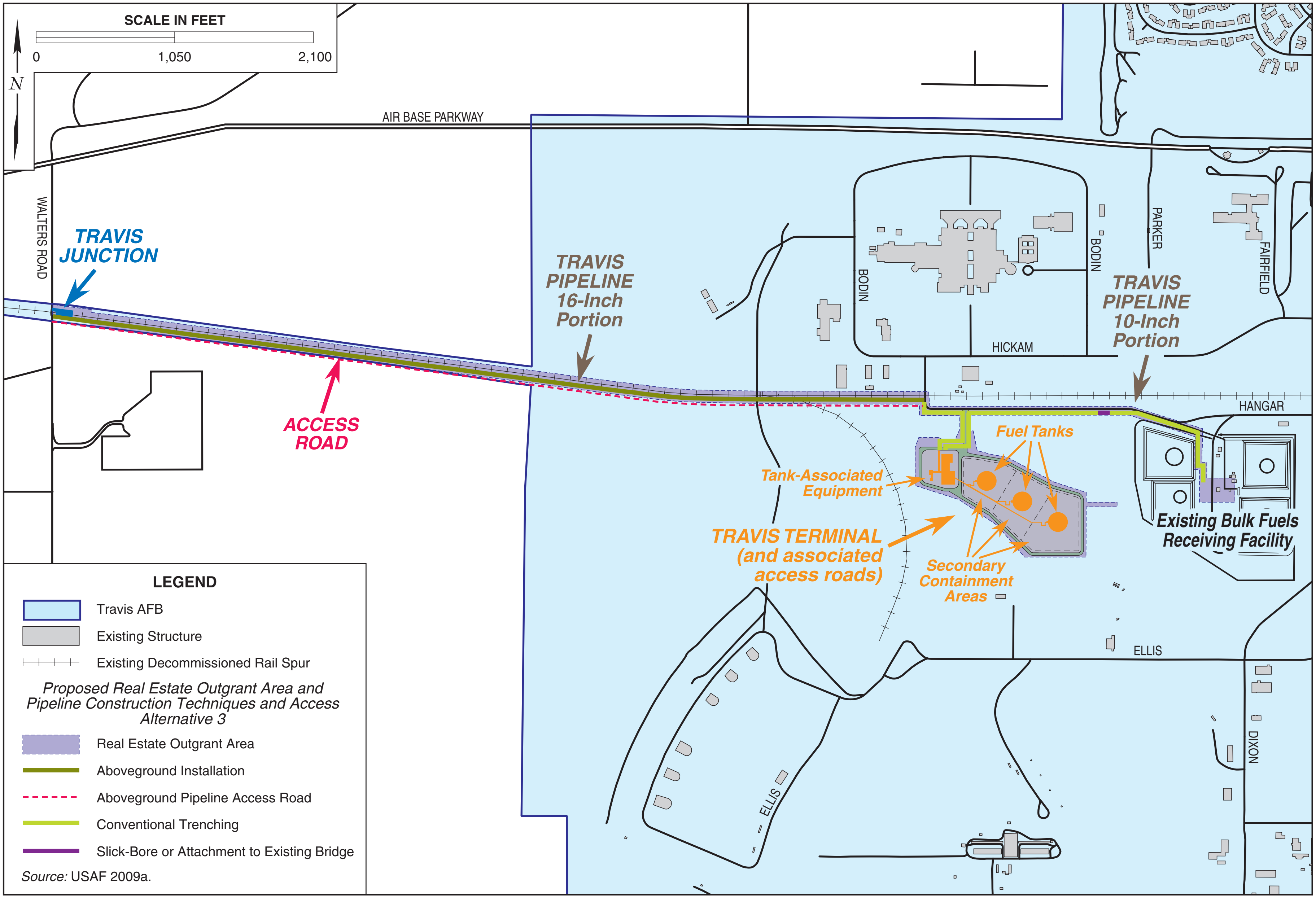

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**Travis Pipeline, Including Location of the Aboveground Portion and Access Road under Alternative 3
Travis Air Force Base**

FIGURE 2-3

On-site, ancillary equipment associated with the Travis Terminal would include high- and low-pressure surge relief valves, incoming pressure let-down control valves, and metering equipment. Particulate filters and filter separators would be located downstream of each tank, and clay treatment systems would be located between each particulate filter and filter separator. Additional ancillary equipment would include a shipping pump which would transfer JP-8 to the existing Travis AFB fuel distribution and dispensation infrastructure via the 10-inch segment of the Travis Pipeline at 2,000 gallons per minute, and injection facilities which would supply Fuel System Icing Inhibitor (FSII), Corrosion Inhibitor (CI), and Static Discharge Additive (SDA). Several prefabricated buildings would also be installed to support automated tank operation equipment storage, spare part storage, switchgear, sampling, and restrooms. The Travis Terminal would be unmanned with control and monitoring provided remotely from the Concord Station; the facility would be secured with a perimeter fence and cameras.

Construction of the Travis Terminal would disturb an additional approximately 0.72 acre along the perimeter of the 13.34-acre permanent facility footprint. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

2.5.1.2 Travis Junction

The Travis Junction component would involve the installation of a facility to connect the newly-established Travis Pipeline with the SFPP Concord-to-Sacramento Pipeline at the junction of the rail spur and Walters Road near the western perimeter of Travis AFB (refer to Figures 2-1 to 2-3). An aboveground facility would occupy approximately 0.17 acre, and would contain an above grade 20-inch valve, three 16-inch valves, associated piping and pig launching facilities, and a small parking area for maintenance personnel. The facility would be fenced and lighted, and controlled and monitored remotely from the Concord Station.

The Travis Junction would be partially constructed over an approximately 0.017-acre portion of the drainage ditch located along the south side of the decommissioned rail spur. Stormwater would be redirected through a culvert into the drainage ditch along the north side of the rail spur. Construction of the Travis Junction would disturb an additional approximately 0.12 acre north of the facility footprint, including an approximately 0.017-acre portion of the drainage ditch along the north side of the rail spur. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

2.5.1.3 Concord Station

The Concord Station component would involve the installation of tie-in equipment to route JP-8 stored at the SFPP-owned and operated Concord Station, located adjacent to the City of Concord, approximately 20 miles south of Travis AFB (refer to Figure 1-2). This component would include the installation of a new 20-inch suction line that would tie an on-site JP-8 storage tank into the SFPP Concord-to-Sacramento Pipeline via a surge pump. The new suction line and pump would allow for the transport of JP-8 from the Concord Station, via the Concord-to-Sacramento Pipeline, to the Travis Junction, through the Travis Pipeline, to the Travis Terminal, and, ultimately, to existing Travis AFB fuel distribution and dispensation infrastructure. Construction and other modifications to the physical environment at Concord Station would be very limited and restricted to existing disturbed areas within the fenced facility.

2.5.1.4 Removal of Rail Tracks and Ties

Prior to commencement of pipeline construction activities, all rail tracks and ties located on the bed of existing decommissioned rail spur between Walters Road and Hangar Avenue would be removed, transported, and disposed of in accordance with all applicable Federal, state, and local regulations. The actual use of the rail bed after removal of the tracks and ties and additional rail bed modifications under each alternative are presented in Sections 2.5.2 to 2.5.4.

2.5.1.5 Temporary Staging Areas

Two primary temporary staging areas would be established on Travis AFB property for equipment maintenance and materials storage. A staging area totaling approximately 0.64 acre would be located along the existing rail spur west of Walters Road. This area would primarily be used for staging, maintenance, and storage activities related to construction of the Travis Junction and the western portion of the Travis Pipeline. A second staging area totaling approximately 1.81 acres would be located adjacent to the northwest perimeter of the Travis Terminal. This area would primarily be used for activities related to construction of the terminal and the central and eastern portions of the Travis Pipeline. Both staging areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. Additional temporary disturbance areas specific to construction of the Travis Pipeline are presented for each alternative in Sections 2.5.2 to 2.5.4.

2.5.2 Alternative 1 – Proposed Action

Alternative 1, the Proposed Action, would involve installation of the Travis Terminal, Travis Junction, and Concord Station, removal of the rail tracks and ties, and establishment of the two temporary staging areas, as described above in Section 2.5.1.

2.5.2.1 Travis Pipeline

Under the Proposed Action, the approximately 1.4-mile 16-inch portion of the Travis Pipeline would be installed primarily by the use of HDD construction techniques, as well as by the use of conventional trenching in limited segments (refer to Figure 2-1).

HDD would be used to install approximately 1.1 miles of the 16-inch pipeline located along the existing decommissioned rail spur in the western part of Travis AFB. This pipeline segment would be located south of the rail spur beneath identified sensitive natural resources (including vernal pools and potentially suitable habitat for special-status species). The approximately 0.68-acre HDD entry point would be located south of the Aero Club and the DGMC, approximately 100 feet south of the existing rail spur. The approximately 0.25-acre HDD exit point would be located approximately 1.0 mile west of the entry point, near Walters Road. Establishment of the entry and exit point ROW areas would temporarily disturb approximately 0.93 acre in the ROW footprints, including approximately 0.038 acre of the drainage ditches located along the rail spur. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. In addition, to facilitate stringing and assembly of the finished pipeline prior to insertion into the pilot hole, a pipeline fabrication area would established along the existing rail spur immediately north of the HDD entry point after removal of the tracks and ties. The fabrication area would be approximately 1.0 mile long by 20 feet wide, or approximately 2.42 acres, and would be located entirely in previously disturbed areas.

Conventional trenching would be used to install the remaining approximately 0.3 mile of the 16-inch pipeline, including approximately 150 feet located between the HDD exit point and the Travis Junction, and approximately 1,330 feet located between the HDD entry point and the Travis Terminal (refer to Figure 2-1). Temporary disturbance would be restricted to 50 feet or less in width along both pipeline segments, with a total disturbance area of approximately 0.88 acre. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

The approximately 0.5-mile 10-inch portion of the Travis Pipeline would be installed primarily by the use of conventional trenching (refer to Figure 2-1). The pipeline footprint would begin at the Travis Terminal, travel north for approximately 0.1 mile in the footprint of an existing roadway, then east for approximately 0.3 mile along the southern edge of Hangar Avenue, and finally south for approximately 0.1 mile into the existing Travis AFB *Bulk Fuels Receiving Facility*. Installation would occur in a combination of existing paved and other previously disturbed areas, and temporary disturbance would be restricted to 50 to 75 feet in width depending on the segment of the pipeline footprint. The temporary disturbance area would total approximately 3.03 acres, including approximately 1.55 acres of existing paved areas and approximately 1.48 acres of other previously disturbed areas. All temporarily disturbed areas would be

restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

An approximately 75-foot segment of the 10-inch portion of the Travis Pipeline would cross the channelized west branch of Union Creek (refer to Figure 2-1). This pipeline segment would be installed by the use of slick-bore beneath the channel or by attachment to the existing bridge crossing the channel. All staging and access related to installation of this pipeline segment would occur via adjacent conventionally trenched areas, and no disturbance to Union Creek would occur.

All belowground segments of the Travis Pipeline would be buried at a minimum of 42 inches below the restored ground surface or, where segments pass under surface water resources, depth would be increased to 60 inches below the flow line. To enable internal maintenance inspections, a pig launcher and receiver would be respectively installed in the pipeline at the Travis Junction and Travis Terminal. This system would allow “smart” pigs to be launched through the pipeline for regular maintenance and inspection (refer to Section 2.3.3, *Pipeline Maintenance*, for additional information).

Primary access for construction of the Travis Pipeline under the Proposed Action would occur via the bed of the decommissioned rail spur after removal of the tracks and ties. After completion of construction activities, the rail bed would be maintained as an access road for future pipeline maintenance and repairs; however, no foreign material (e.g., gravel, asphalt, etc.) would be placed on the rail bed.

2.5.2.2 Real Estate Outgrant Area

Under the Proposed Action, Travis AFB would outgrant to SFPP approximately 32.60 acres of real estate on the base via easement and ROW to facilitate the installation of all on-base project components (refer to Figure 2-1). The real estate proposed for outgrant would consist of two adjacent legal description parcels (USAF 2009a) which, when combined, would be comprised of the following geographical components:

- a 75-foot easement located along the centerline of the 1.4-mile 16-inch portion of the Travis Pipeline, totaling approximately 12.36 acres; the Travis Junction would be located within this portion of the proposed real estate outgrant area;
- the Travis Terminal footprint, including associated access and maintenance roads, and additional areas adjacent to the footprint, totaling approximately 16.21 acres;
- a 50- to 75-foot easement located along the centerline of the 0.5-mile 10-inch portion of the Travis Pipeline, totaling approximately 2.89 acres; and,
- a rectangular area within the existing Travis AFB *Bulk Fuels Receiving Facility*, totaling approximately 1.14 acres.

SFPP would install, own, operate, and maintain all project components proposed for installation on the Travis AFB real estate outgrant area.

2.5.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

Alternative 2 would involve the installation of the Travis Terminal, Travis Junction, and Concord Station, removal of tracks and ties on the bed of the existing decommissioned rail spur, and establishment of temporary staging areas, as described in Section 2.5.1 (refer to Figure 2-2). Further, installation of the approximately 0.5-mile 10-inch portion of the Travis Pipeline under Alternative 2 would be the same as the Proposed Action, as described in Section 2.5.2.1, *Travis Pipeline*.

Under Alternative 2, the approximately 1.4-mile 16-inch portion of the Travis Pipeline would be installed by a combination of slick-bore and conventional trenching construction techniques (refer to Figure 2-2).

The use of slick-bore would occur at four locations along the pipeline footprint in order to avoid identified sensitive natural resources (including vernal pools and potentially suitable special-status species habitat). The length of each bore would vary from 150 to 250 feet depending upon the size of the resource being avoided, and the combined length of all four bores would total approximately 0.2 mile. All staging and access related to slick-bore would occur via adjacent conventionally trenched areas, and no surface disturbance would occur along the slick-bore segments.

Conventional trenching would be used to install the approximately 1.2 miles of the 16-inch portion of the Travis Pipeline not installed by slick-bore (refer to Figure 2-2). Temporary disturbance would be restricted to 50 feet or less in width on all pipeline segments. The temporary disturbance area would total approximately 6.88 acres, including approximately 0.33 acre of the drainage ditch along the north side of the rail spur, approximately 0.42 acre of existing paved areas, and approximately 6.13 acres of other previously disturbed areas. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

As with the Proposed Action, all belowground segments of the Travis Pipeline under Alternative 2 would be buried at a minimum of 42 inches below the restored ground surface or, where segments pass under surface water resources, depth would be increased to 60 inches below the flow line. A pig launcher and receiver would also be respectively installed in the pipeline at the Travis Junction and Travis Terminal to allow the launch of "smart" pigs through the pipeline for regular maintenance and inspection.

Similar to the Proposed Action, primary access for construction of the Travis Pipeline under Alternative 2 would occur via the bed of the decommissioned rail spur after removal of the tracks and ties. The rail bed would be maintained as an access road after completion of construction activities, and no foreign material would be placed on the rail bed.

2.5.3.1 Real Estate Outgrant Area

Under Alternative 2, Travis AFB would outgrant to SFPP approximately 35.29 acres of real estate on the base via easement and ROW to facilitate the installation of all on-base project components (refer to Figure 2-2). The real estate proposed for outgrant would consist of two adjacent legal description parcels (USAF 2009a) which, when combined, would be comprised of the following geographical components:

- a 75- to 100-foot easement located along the centerline of the 1.4-mile 16-inch portion of the Travis Pipeline, totaling approximately 15.05 acres; the Travis Junction would be located within this portion of the proposed real estate outgrant area;
- the Travis Terminal footprint, including associated access and maintenance roads, and additional areas adjacent to the footprint, totaling approximately 16.21 acres;
- a 50- to 75-foot easement located along the centerline of the 0.5-mile 10-inch portion of the Travis Pipeline, totaling approximately 2.89 acres; and,
- a rectangular area within the existing Travis AFB *Bulk Fuels Receiving Facility*, totaling approximately 1.14 acres.

SFPP would install, own, operate, and maintain all project components proposed for installation on the Travis AFB real estate outgrant area.

2.5.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

Alternative 3 would involve the installation of the Travis Terminal, Travis Junction, and Concord Station, removal of tracks and ties on the bed of the existing decommissioned rail spur, and establishment of temporary staging areas, as described in Section 2.5.1 (refer to Figure 2-3). Further, installation of the approximately 0.5-mile 10-inch portion of the Travis Pipeline under Alternative 3 would be the same as the Proposed Action, as described in Section 2.5.2.1, *Travis Pipeline*.

Under Alternative 3, approximately 1.2 miles of the 1.4-mile 16-inch portion of the Travis Pipeline would be installed aboveground on the bed of the decommissioned rail spur after removal of the rail tracks and ties (refer to Figure 2-3). Preparation of the pipeline footprint would be largely limited to clearing and grading, and minimal excavation would occur. During construction, pipe supports, expansion loops, and anchors would first be placed along the path of the pipeline, and then installation of the pipeline would occur. Prior to commencing operations, a perimeter fence and cameras would also be installed around to pipeline to ensure security. Pipeline construction would temporarily disturb approximately 7.60 acres, including approximately 1.71 acres of the drainage ditches along both sides of the rail spur, and approximately 5.89 acres of previously disturbed areas. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring

pre-construction contours and revegetating with native plant species. An additional approximately 3.54 acres of the rail bed would be located in the permanent aboveground pipeline footprint.

Construction and operation of the aboveground pipeline under Alternative 3 would include the establishment of a permanent construction and maintenance access road adjacent to the drainage ditch along the south side of the rail spur (refer to Figure 2-3). Approximately 3.30 acres would be located within the roadway footprint, including approximately 3.02 acres of previously disturbed areas and approximately 0.28 acre of areas identified as containing sensitive natural resources (including vernal pools and potentially suitable habitat for special-status species). Installation of culverts and other measures to redirect stormwater would minimize changes to existing hydrology in the vicinity of the roadway footprint.

The approximately 0.2 mile of the 16-inch portion of the Travis Pipeline not installed aboveground on the rail spur bed would be installed belowground by conventional trenching (refer to Figure 2-3). Temporary disturbance would be restricted to 50 feet or less in width along the entire belowground segment. The temporary disturbance area would total approximately 0.53 acre, including approximately 0.27 acre of existing paved areas, and approximately 0.26 acre of other previously disturbed areas. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

As with the Proposed Action, all belowground segments of the Travis Pipeline under Alternative 3 would be buried at a minimum of 42 inches below the restored ground surface or, where segments pass under surface water resources, depth would be increased to 60 inches below the flow line. A pig launcher and receiver would also be respectively installed in the pipeline at the Travis Junction and Travis Terminal to allow the launch of "smart" pigs through belowground and aboveground pipeline segments for regular maintenance and inspection.

In 2008, SFPP completed a *Preliminary Pipeline Layout Review* to evaluate the relative feasibility of multiple potential construction scenarios. While feasible, Alternative 3 presented challenges, including security limitations due to the aboveground location of the pipeline, and disturbance to areas identified as containing sensitive natural resources (including vernal pools and potentially suitable habitat for special-status species) due to establishment of a permanent construction and maintenance access road (USAF 2009b).

2.5.4.1 Real Estate Outgrant Area

Under Alternative 3, Travis AFB would outgrant to SFPP approximately 35.29 acres of real estate on the base via easement and ROW to facilitate the installation of all on-base project components (refer to Figure 2-3). The real estate proposed for

outgrant would consist of two adjacent legal description parcels (USAF 2009a) which, when combined, would be comprised of the following geographical components:

- a 100-foot easement encompassing the 1.2-mile aboveground segment of the 16-inch portion of the Travis Pipeline and associated access road, totaling approximately 14.56 acres; the Travis Junction would be located within this portion of the proposed real estate outgrant area;
- a 75-foot easement located along the centerline of the 0.2-mile belowground segment of the 16-inch portion of the Travis Pipeline, totaling approximately 0.49 acres;
- the Travis Terminal footprint, including associated access and maintenance roads, and additional areas adjacent to the footprint, totaling approximately 16.21 acres;
- a 50- to 75-foot easement located along the centerline of the 0.5-mile 10-inch portion of the Travis Pipeline, totaling approximately 2.89 acres; and,
- a rectangular area within the existing Travis AFB *Bulk Fuels Receiving Facility*, totaling approximately 1.14 acres.

SFPP would install, own, operate, and maintain all project components proposed for installation on the Travis AFB real estate outgrant area.

2.5.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, Travis AFB would not implement the Proposed Action or project alternatives. Current fuel storage capacity would remain unchanged; consequently, Travis AFB would not have access to SFPP's recently modernized fuel distribution network or the JP-8 distribution and dispensation infrastructure needed to fully implement its air mobility missions or anticipated future mission assignments. Further, Travis AFB would be required to continue use of approximately 7 miles of older USAF-owned and operated off-base pipeline. However, because CEQ regulations require that the No-Action Alternative be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented, this alternative will be carried forward for analysis in the EA.

2.6 DESCRIPTION OF PAST AND REASONABLY FORESEEABLE FUTURE ACTIONS RELEVANT TO CUMULATIVE IMPACTS

Upon completion of the environmental planning process, execution of the necessary real estate outgrant documents, and receipt of all necessary permits, the construction timeline for the Travis Terminal under the Proposed Action or project alternatives is anticipated to last approximately 18 to 22 months. Construction of the Travis Pipeline and Travis Junction is anticipated to last 3 to 4 months and would be restricted to the dry season (i.e., 16 April to 14 October).

The most recent noteworthy action implemented at Travis AFB was the beddown of a new inventory of C-17 aircraft, including construction of administrative and maintenance facilities associated with that aircraft and mission. Other projects identified as reasonably foreseeable (i.e., within 2-3 years) at Travis AFB and proposed to be located within 2 miles of the proposed project footprint include:

- Construction of a helipad to support the DGMC, located approximately 0.5 mile from of the project footprint;
- Replacement of gates and pavement repairs associated with the DGMC, located approximately 0.5 mile from the project footprint;
- Repairs to the Travis AFB Main Gate, located approximately 0.5 mile from the project footprint;
- Construction of a new KC-10 Cargo Load Trainer, located approximately 1.0 mile from the project footprint;
- Establishment of a new K-9 dog training facility, located approximately 1.0 mile from the project footprint; and,
- Construction of a new C-17/C-5 Squadron Operations/Air Guard Station Training Facility, located approximately 2 miles from the project footprint.

With regard to off-base projects, residential development in neighboring communities (e.g., Fairfield, Suisun City) has slowed recently and no large-scale residential developments are currently anticipated within the area directly affected by operations at the base. One transportation project—Jepson Parkway—is proposed for implementation along Walters Road and would be located along the western boundary of the base adjacent to the proposed Travis Junction location. However, the project is currently in the preliminary planning stages, and project implementation is not expected to occur concurrently with the construction timeline for the Proposed Action or project alternatives. Further, any physical changes associated with this project would be limited to off-base road and landscaping development along Walters Road (Solano Transit Authority [STA] 2000).

2.7 IDENTIFICATION OF PREFERRED ALTERNATIVE

Alternative 1—the Proposed Action—is the Preferred Alternative based on a thorough examination of feasible alternatives and consideration of anticipated environmental effects associated with the alternatives considered.

SECTION 3
AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This section describes pertinent existing environmental conditions for resources potentially affected by the Proposed Action and identified alternatives. In compliance with NEPA, CEQ regulations, UFC 3-260-01, *Airfield and Heliport Planning and Design*, and 32 CFR § 989, the description of the affected environment focuses on only those aspects potentially subject to impacts. In the case of the Proposed Action and project alternatives at Travis AFB, the affected environment description is limited primarily to the base and Solano County. Where relevant, the description may also specifically focus on the *composite outgrant area*, or composite of real estate outgrant areas for all project alternatives, or the *area of potential effect* (APE), or composite of temporary disturbance and permanent footprints associated with all project alternatives.

Resource descriptions focus on the following areas: *air quality*; *noise*; *wastes, hazardous materials, and stored fuels*; *water resources*; *biological resources*; *socioeconomic resources*; *cultural resources*; *land use*; *transportation systems*; *safety and occupational health*; *environmental management*; and, *environmental justice*. Since *airspace and airfield operations* would not be affected by the Proposed Action, it was excluded from discussion to keep the analysis relevant and concise.

3.2 AIR QUALITY

3.2.1 Definition of Resource

Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. NAAQS are established by the USEPA for criteria pollutants, including: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than ten microns in diameter (PM_{10}) or 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). NAAQS represent maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare. In addition, the California Air Resources Board (CARB) has established *California Ambient Air Quality Standards* (CAAQS) applicable within the State of California for these pollutants, as well as hydrogen sulfide (H_2S), sulfates, vinyl chloride, and visibility-reducing particles (VRPs).

3.2.1.1 Air Pollutants

Air quality is affected by stationary sources (e.g., industrial development) and mobile sources (e.g., motor vehicles). Air quality at a given location is a function of several factors, including the quantity and type of pollutants emitted locally and regionally, and the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersion are wind speed and direction, atmospheric stability, temperature, the presence or absence of inversions, and topography.

Ozone (O_3). The majority of ground-level (or terrestrial) O_3 is formed as a result of complex photochemical reactions in the atmosphere involving volatile organic compounds (VOCs), nitrogen oxides (NO_x), and oxygen. O_3 is a highly reactive gas that reduces lung function and sensitizes the lung to other irritants. Although *stratospheric* O_3 shields the earth from damaging ultraviolet radiation, *terrestrial* O_3 is a highly damaging air pollutant and is the primary source of smog. Ozone is controlled by regulating sources of VOCs and NOx.

In April 2004, the USEPA issued the final rule for 8-hour O_3, revising the 1-hour O_3 NAAQS standard. The 8-hour standard is more stringent than the 1-hour standard, and non-attainment areas for 8-hour O_3 are now designated. As of 15 June 2005, the 1-hour standard was revoked for all areas except those without effect dates for 8-hour O_3 designations (USEPA 2008a). On 12 March 2008, the USEPA revised the 8-hour O_3 NAAQS to a level of 0.075 parts per million (ppm) from the previous level of 0.08 ppm. The change, designed to improve the protection of public health, went into effect on 27 March 2008 (USEPA 2008b).

Carbon Monoxide (CO). CO is a colorless, odorless, poisonous gas produced by incomplete burning of carbon compounds in fuel. The health threat from CO is most serious for those who suffer from cardiovascular disease, particularly those with angina and peripheral vascular disease.

Nitrogen Dioxide (NO_2). NO_2 is a highly reactive gas that can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Repeated exposure to high concentrations of NO_2 may cause acute respiratory disease in children. Because NO_2 is an important precursor in the formation of O_3 (or smog), control of NO_2 emissions is an important component of overall pollution reduction strategies. The two primary sources of NO_2 in the U.S. are fuel combustion and transportation.

Sulfur Dioxide (SO_2). SO_2 is emitted primarily from stationary source coal and oil combustion, steel mills, refineries, pulp and paper mills, and from non-ferrous smelters. High concentrations of SO_2 may aggravate existing respiratory and cardiovascular disease; asthmatics and those with emphysema or bronchitis are the most sensitive to SO_2 exposure. SO_2 also contributes to acid rain, which can lead to the acidification of lakes and streams and damage trees.

Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter (PM) is a mixture of tiny particles that vary greatly in shape, size, and chemical composition, and can be comprised of metals, soot, soil, and dust. PM_{10} includes larger, coarse particles, whereas $PM_{2.5}$ includes smaller, fine particles. Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Sources of fine particles include all types of combustion activities (e.g., motor vehicles, power plants, wood burning) and certain industrial processes. Exposure to PM_{10} and $PM_{2.5}$ levels exceeding current standards can result in increased lung- and heart-related respiratory illness. The USEPA has concluded that finer particles are more likely to contribute to health problems than those greater than 10 microns in diameter.

Airborne Lead (Pb). Airborne lead can be inhaled directly or ingested indirectly by consuming lead-contaminated food, water, or non-food materials such as dust or soil. Infants and children are most sensitive to Pb exposure. Pb has been identified as a factor in high blood pressure and heart disease. Exposure to Pb has declined dramatically in the last 10 years as a result of the reduction of Pb in gasoline and paint, and the elimination of Pb from soldered cans.

Hazardous Air Pollutants (HAPs). Hazardous air pollutants are air toxics for which Federal and state ambient air quality standards have not been established. However, the USEPA regulates individual and total HAPs through *Maximum Achievable Control Technology* (MACT) which determines standards based upon the maximum degree of emission reduction determined achievable. At the state level, CARB regulates toxic air contaminants (TACs), which include Federal HAPs and other pollutants. CARB requires the use of *Best Available Control Technology* (BACT) to limit TAC and HAP emissions.

3.2.1.2 Greenhouse Gases and Global Climate Change

Global climate change is a transformation in the average weather of the earth which can be measured by changes in temperature, wind patterns, and precipitation. Scientific consensus has identified human-related emission of greenhouse gases (GHGs) above natural levels as a significant contributor to global climate change (U.S. Climate Change Science Program [USCCSP] 2007). GHGs trap heat in the atmosphere and regulate the earth's temperature. They include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ground-level O_3, and fluorinated gases such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HFCs).

Total emissions of GHGs are the net balance of emission *sources* and *sinks*: sources include human-related combustion and fuel consumption, while sinks consist of natural geological and biological processes (e.g., photosynthesis) which remove emissions from the atmosphere. Industrial activities in the past 200 years have modified the emissions source-sink balance and significantly increased net GHG emissions (USCCSP 2007). In the U.S., sources produced approximately 7054 tons of GHG emissions in 2006, while sinks removed only approximately 884 tons during the same period, resulting in net GHG emissions of approximately 6170 tons. CO_2 was the greatest emissions contributor (85 percent of 2006 total), followed by CH_4 (7.9 percent), N_2O (5.2 percent), and fluorinated gases such as HFCs, sulfur hexafluoride (SF_6), and perfluorocarbons (PFCs) (2.1 percent) (USEPA 2006).

Primary activities associated with GHG emissions include utilities (e.g., power generation and transport), transportation, industrial/manufacturing, agriculture, and commercial and residential consumption. The top U.S. end-use sector sources of CO_2 emissions in 2006 included transportation (33 percent), residential and commercial (20 and 18 percent, respectively) and industrial (28 percent). Electricity generation for the previously mentioned end-use sectors accounted for 41 percent of CO_2 emissions in 2006 (USEPA 2006). Primary human activity sources of increased GHG emissions include the combustion of fossil fuels and deforestation (CO_2); land use and wetland depletion, and livestock and landfill emissions (CH_4); the manufacturing and use of

refrigeration and fire suppression systems (CFCs); and, the use of fertilizer for agricultural activities (N_2O).

3.2.1.3 Regulatory Framework

The CAA Amendments of 1990 place most of the responsibility to achieve compliance with NAAQS on individual states. The State of California is geographically divided into Air Pollution Control Districts (APCDs), each of which is required to adopt strategies for achieving NAAQS, as well as the State's CAAQS. Each APCD must also adopt a SIP which is a compilation of goals, strategies, schedules, and enforcement actions designed to lead the State into compliance with all NAAQS.

APCDs not in compliance with a standard can be declared *nonattainment* areas by the USEPA or CARB. In order to reach *attainment*, NAAQS may not be exceeded more than once per year, except for 8-hour O_3, for which the fourth-highest value in a year may not exceed NAAQS. A *nonattainment* area can reach *attainment* when NAAQS have been met for a period of ten consecutive years. During this time period the area is in *transitional attainment*, also termed *maintenance*.

3.2.2 Existing Conditions

3.2.2.1 Climate

Travis AFB is located in an inland area with a marine air influence. Regional weather consists of mild, wet winters and warm, dry summers, characteristic of the marine air influx. Summer temperatures average 69 degrees Fahrenheit (°F) during June to August, with a mean maximum temperature of approximately 85.5°F. Winter temperatures average 47.5°F during December to February, with a mean minimum temperature of approximately 40°F. Precipitation mostly occurs during the October to April rainy season, and little or no little rainfall occurs during May to September. The mean annual precipitation rate is 19.2 inches, with approximately 83 percent of the annual rainfall occurring during the rainy season (USAF 2003a).

3.2.2.2 Local Air Quality

Travis AFB is located in the portion of Solano County[1] within the San Francisco Bay Area Air Basin (SFBAAB) and governed by the BAAQMD (USAF 2003b). The SFBAAB is currently designated by the USEPA as an NAAQS *attainment* area for CO, NO_2, SO_2, $PM_{2.5}$, PM_{10}, and Pb, and a *moderate nonattainment* area for Federal 1-hour and 8-hour O_3 standards (USEPA 2008c). Exceedances of NAAQS since 1992 include 1-hour O_3 (1992-1994, 1999-2007), 8-hour O_3 (2004-2007), and CO (1992-1997) (USEPA 2008d). The basin is currently designated by CARB as a CAAQS *attainment* area for CO, NO_2, SO_2, Pb, and sulfates, and a *nonattainment* area for $PM_{2.5}$, PM_{10}, and state 1-hour and 8-hour O_3 standards; VRPs and H_2S are not measured in the SFBAAB (CARB 2006).

[1] The western part of Solano County, including the part of Travis AFB relevant to this document, is located within the SFBAAB; the eastern part is located within the Sacramento Valley Air Basin.

Current NAAQS and CAAQS and measured emission levels in Solano County in 2008 are presented in Table 3-1.

Table 3-1 National and California Ambient Air Quality Standards, and Measured Emission Levels (2008) for Solano County, California

Pollutant	Averaging Time	National Standards (Primary)	California Standards	Measured Levels in Solano County
O_3	8 hour	0.075 ppm	0.070 ppm	0.046 ppm
	1 hour	0.12 ppm	0.009 ppm	0.053 ppm
CO	8 hour	9.0 ppm	9.0 ppm	1.7 ppm
	1 hour	35 ppm	20 ppm	2.5 ppm
NO_2	Annual Arithmetic Mean	0.053 ppm	0.030 ppm	0.013 ppm
	1 hour	0.18 ppm	NSE	N/A
SO_2	Annual Average	0.030 ppm	NSE	0.002 ppm
	24 hour	0.14 ppm	0.04 ppm	0.004 ppm
	1 hour	NSE	0.25 ppm	N/A
PM_{10}	Annual Arithmetic Mean	50 μg/m³	30 μg/m³	14 μg/m³
	24 hour	150 μg/m³	50 μg/m³	25 μg/m³
$PM_{2.5}$	Annual Arithmetic Mean	15 μg/m³	15 μg/m³	7.7 μg/m³
	24 hour	65 μg/m³	66 μg/m³	3.1 μg/m³
Pb	Calendar Quarter	1.5 μg/m³	NSE	0.01 μg/m³
	30 day	NSE	1.5 μg/m³	N/A

μg/m³ = micrograms per cubic meter
N/A = not available
NSE = no standard established
ppm = parts per million
Sources: CARB 2008; USEPA 2008e, 2008f.

3.2.2.3 Emissions at Travis Air Force Base

Emissions Thresholds and Permitting

CAA Amendments *Title V* Operating Permit thresholds are defined as emissions from stationary sources in excess of 100 tons per year (tpy) of any of the criteria pollutants, or 10 or 25 tpy of any single or combination of HAPs, respectively (BAAQMD 2001). Since Travis AFB emissions are below *Title V* thresholds, it is considered a minor source for air emissions (USAF 2003b).

Travis AFB operates under a BAAQMD *Synthetic Minor Facilities Permit*, which contains provisions to limit the base's potential emission levels to below defined thresholds. As part of the base-requested and BAAQMD-approved revision to *Condition 19843 of the BAAQMD Permit to Operate for Plant #770*, allowable 12-month rolling emissions of

precursor organic compounds (POCs), including NO_x and reactive organic gasses (ROGs), were reduced from 95 tpy to 34 tpy (USAF 2009b).

Air Emissions Inventory

The current Travis AFB *Air Emissions Inventory* (AEI) (USAF 2003b) evaluated actual emissions from on-base stationary, mobile, area and event (e.g., pesticide applications), and portable sources. Actual emissions were measured separately for the DGMC and Army/Air Force Exchange Service (AAFES) Gas Station since those sources operate under separate air emissions permits from the base's permit. The AEI also evaluated potential emissions from on-base stationary sources, the DGMC, and AAFES Gas Station. Data are for calendar year (CY) 2003 and include emissions for CO, NO_x, PM_{10}, SO_2, VOCs, and HAPs.

Emissions from stationary combustion sources at Travis AFB totaled roughly 72.1 tons in CY 2003, well within the BAAQMD *Synthetic Minor Facilities Permit* threshold. Respective emissions from mobile and portable sources at the base were approximately 4,433.9 and 91.4 tons during the same period (USAF 2003b). Mobile source emissions are not considered when determining if the base would require a Major Source, or *Title V*, Operating Permit. Actual and potential emissions at Travis AFB are respectively summarized in Tables 3-2 and 3-3.

Table 3-2 Summary of Actual Emissions at Travis Air Force Base (2003)

Combustion Source	Pollutant (tpy)						
	CO	NO_x	SO_x	VOCs	PM_{10}	HAPs	Total
Stationary	23.1	30.4	3.4	12.0	2.4	0.8	*72.1*
Mobile	768.9	2,538.3	671.3	276.8	160.6	N/A	*4,415.9*
Portable	13.9	64.4	4.2	4.2	4.5	N/A	*91.2*
Area and Event	0.06	0.11	0.00	2.1	0.02	N/A	*2.29*
DGMC	2.9	4.1	0.04	0.21	0.27	0.11	*7.63*
AAFES Gas Station	0.00	0.00	0.00	13.7	0.00	2.3	*16.0*
Total	**808.86**	**2,637.31**	678.94	**309.01**	**167.79**	**3.21**	***4,605.12***

tpy = tons per year
Source: USAF 2003b.

Table 3-3 Summary of Potential Emissions at Travis Air Force Base (2003)

Combustion Source	Pollutant (tpy)						
	CO	NO_x	SO_x	VOCs	PM_{10}	HAPs	Total
Stationary	205.0	175.0	21.0	125.0	29.0	12.9	*567.9*
DGMC	18.0	31.0	3.0	2.0	2.0	1.4	*57.4*
AAFES Gas Station	223.0	206.0	24.0	164.0	31.0	4.3	*652.3*
Total	**446.0**	**412.0**	**48.0**	**291.0**	**62.0**	**18.6**	***1,277.6***

tpy = tons per year
Source: USAF 2003b.

Storage Tanks and Fuel Dispensing Operations Emissions

The Travis AFB AEI included the measurement of VOC emissions related to storage tanks and fuel dispensing operations. Emissions calculations were based upon an inventory of 97 tanks, including: 82 aboveground storage tanks (ASTs) (58 diesel, 14 JP-8, 5 gasoline, 3 fuel oil, and 2 aviation gasoline [avgas] tanks); and 15 underground storage tanks (USTs) (7 JP-8, 5 gasoline, and 3 diesel tanks) (USAF 2003b).

Total actual emissions for the inventory of storage tanks were 2.1 tons in CY 2003, including 1.8 tons for ASTs and 0.3 tons for USTs. Total potential emissions for the calculated inventory of storage tanks were approximately 8.2 tons during the same time period (USAF 2003b). Actual and potential emissions related to on-base storage tanks are presented in Table 3-4.

Table 3-4 Summary of Actual and Potential Emissions Related to Storage Tanks at Travis Air Force Base (2003)

Combustion Source	Pollutant (tpy)	
	VOCs Actual Emissions	VOCs Potential Emissions
Aboveground Storage Tanks (ASTs)	1.8	4.1
Underground Storage Tanks (USTs)	0.3	4.1
Total of All Storage Tanks	**2.1**	**8.2**

tpy = tons per year
Source: USAF 2003b.

In 2003, fuel dispensing emissions at Travis AFB totaled approximately 1.05 tons (Table 3-5), including 0.06 tons of HAPs and 0.99 tons of VOCs. Of total VOC emissions, approximately 69.7 percent were from avgas or JP-8; the remaining emissions were unrelated to aircraft fueling activities (USAF 2003b).

Table 3-5 Summary of Actual Emissions Related to Fuel Dispensing Operations at Travis Air Force Base (2003)

Combustion Source	Pollutant (tpy)	
	HAPs	VOCs
JP-8 and Avgas	N/D	0.69
Other Fuels	N/D	0.30
Total	**0.06**	**0.99**

tpy = tons per year
N/D = not distinguished; HAPs are presented for total fuel dispensing operations only.
Source: USAF 2003b.

3.3 NOISE

3.3.1 Definition of Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise [FICON] 1992). Human response to noise can vary

according to the type and characteristics of the noise source, distance between the noise source and receptor, sensitivity of the receptor, and time of day. Sound is expressed in decibels (dB), a logarithmic unit of measure. A 10 dB increase in noise level corresponds to a 100 percent increase in perceived loudness. Sound measurement is further refined by using an A-weighted decibel (dBA) scale that emphasizes the range of sound frequencies that are most audible to the human ear. Day-night sound level (DNL) is a noise metric that averages dBA sound levels over a 24-hour period, with an additional 10-dB penalty added to noise events occurring between 10:00 PM and 7:00 AM. DNL is the preferred noise metric of the DoD, DOT, Federal Aviation Administration (FAA), and other Federal agencies. In California, community noise exposure level (CNEL) is used instead of DNL for airfield noise measurements and is approved by the DoD and other Federal agencies. Aircraft noise exposure around DoD facilities is assessed by the NOISEMAP model which overlays a regularly spaced "grid" containing DNL or CNEL noise contours onto a base vicinity map. These noise contours are used to determine the compatibility of aircraft operations, other base operations, and construction activities with local land use.

3.3.2 Existing Conditions

3.3.2.1 Land Use

Land use around Travis AFB is divided into two distinct noise environments. Areas to the west of the base are comprised of a low-density suburban setting where noise is typically limited to vehicles on local highways or light industrial activities (Solano County 2002). According to FICON, this type of land use has a maximum acceptable outdoor noise level of 45 to 55 CNEL (FICON 1992). Areas to the north, east, and south of the base are comprised of agricultural and rural residential uses where noise is typically associated with operation of farming equipment or occasional vehicle use (Solano County 2002). FICON's maximum acceptable noise level for this type of land use is 60 to 70 CNEL (FICON 1992).

3.3.2.2 Noise Generating Activities

Aircraft activity is the primary noise generator at Travis AFB. Aircraft noise exposure associated with the base was calculated in the 2002 *Travis AFB Land Use Compatibility Plan* (LUCP) (Solano County 2002). 65 CNEL to 85 CNEL noise contours surrounding the airfield are generally aligned with the base's two runways and typical aircraft approach patterns; these contours are mostly within Travis AFB boundaries or undeveloped areas adjacent to the base.

Ground-based activity also contributes to the noise environment at Travis AFB. Major transportation corridors in the vicinity of the base, including Air Base Parkway, Walters Road, and Peabody Road, are the primary source of ground-based noise. On-base vehicle and aircraft maintenance activities also contribute to the noise environment at Travis AFB.

3.3.2.3 Composite Outgrant Area

The *composite outgrant area* is located entirely outside of 65+ CNEL noise contours associated with base aircraft operations (Solano County 2002). No significant noise generators are located within or adjacent to the outgrant area, and the nearest sensitive noise receptors (i.e., on- and off-base residences) are located at least 0.25 mile away. Nearby major transportation corridors, including Air Base Parkway, located approximately 0.5 mile to the north, and Walters Road, located immediately to the west, are the primary source of noise in the vicinity of the outgrant area.

3.4 WASTES, HAZARDOUS MATERIALS, AND STORED FUELS

3.4.1 Definition of Resource

Hazardous wastes are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes which pose a substantial present or potential hazard to human health or the environment. The storage, handling, recycling, and disposal of hazardous wastes is subject to regulations under the *Resource Conservation and Recovery Act* (RCRA), Subtitle C (40 CFR §§ 260-270) which are administered by the USEPA. To prevent inadvertent and potentially harmful releases of hazardous wastes, the DoD has directed that all facilities develop and implement *Hazardous Waste Management Plans* (HWMPs) which establish procedures to achieve and maintain regulatory compliance regarding accumulation, transportation, and disposal of hazardous waste.

Hazardous materials are defined in *CERCLA* as substances with strong physical properties of ignitability, corrosivity, reactivity, or toxicity which may cause an increase in mortality, a serious irreversible illness, incapacitating reversible illness, or pose a substantial threat to human health or the environment. The management of hazardous materials at USAF installations is established by AFI 32-7080, *Pollution Prevention Program*, which directs that installations prepare *ICPs for Oil and Hazardous Substance Spill Prevention and Response* to address training, response, and reporting procedures in the event of a hazardous materials release.

The management of hazardous materials and wastes typically centers on the delivery, storage, transfer, containment, and disposal of bulk fuel and POL. To this end, installations prepare *Spill Prevention, Control and Countermeasures Plans* (SPCCPs), as well as ICPs, which outline spill histories, training procedures, inspections, and facility improvement projects. These plans and programs effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

3.4.2 Existing Conditions

3.4.2.1 Hazardous Waste Generation and Accumulation

Hazardous waste generation, accumulation, transport, and disposal at Travis AFB is managed under the basewide HWMP (USAF 2005) in accordance with all Federal, state, and local regulations. The base is classified as a *large quantity generator* of hazardous waste under both RCRA and California regulations since over 1,000 kilograms of

hazardous waste is generated in a calendar month. About 95 percent of the total volume of hazardous waste generated at the base is associated with aircraft and vehicle maintenance, facilities and equipment maintenance, and aerospace ground equipment (AGE) (USAF 2005). Hazardous waste generated at the base includes flammable solvents, contaminated fuels and lubricants, stripping chemicals, waste oils and paint, and absorbent materials, as well as medical waste associated with the DGMC (USAF 2003c).

A total of approximately 180.3 tons of solid waste and 8,647 gallons (gal) of liquid waste was generated at Travis AFB in 2005 (USAF 2005). According to the HWMP, a total of approximately 75 on-base hazardous waste generation points (HWGPs) generated approximately 275 hazardous waste streams in 2005. A total of 13 HWGPs are located within 0.25 mile of the *composite outgrant area*; these HWGPs generated over 55.2 tons of solid waste and 1,700 gal of liquid waste in 2005 (Table 3-6) (USAF 2005). Refer to *Appendix F* for a complete list of HWGPs at Travis AFB.

Table 3-6 Hazardous Waste Generation Points (HWGPs) and Hazardous and Petroleum Waste Streams Located within 0.25 Mile of the Composite Outgrant Area, Travis Air Force Base (2005)

Bldg. No.	Facility	Distance from Outgrant Area	Number of Streams	Annual Amount	
				Liquid Waste (gal)	Solid Waste (tons)
755	Battery Shop	<0.25 Mile	7	10	36.2
771	Aero Club	<0.25 Mile	1	400	None
775	DGMC Dental Lab	<0.25 Mile	2	None	0.3
777	DGMC Main Hospital Building	<0.25 Mile	6	None	1.1
779	DGMC Power Plant	<0.25 Mile	2	1,000	0.5
793	DGMC Hazardous Waste Accumulation Site	<0.25 Mile	14	100	0.4
803	Metals Technology	<0.25 Mile	7	None	0.9
803	Paint Shop	<0.25 Mile	4	None	5.3
803	Non-Destructive Impact	<0.25 Mile	8	110	10.5
804	Equipment Laboratory	<0.25 Mile	2	75	<0.01
Total Quantity			**53 Streams**	**1,695 Gal.**	**55.2 Tons**

Source: USAF 2005.

Table 3-7 Treatment, Storage, and Disposal Facility (TSDF), and Hazardous Waste Accumulation Sites (HWASs) at Travis Air Force Base

Bldg. No.	Facility	Distance from Outgrant Area	Type	Facility Highlights
793	DGMC HWAS	<0.25 Mile	90-Day HWAS	• 4 storage bays
831	Main HWAS	0.5 to 1.0 Mile	90-Day HWAS	• 6 storage bays
1365	Main Hazardous Waste TSDF	>1.0 Mile	Main Storage and Disposal Facility	• 51,600 gal storage capacity • Six 2,500 gal ASTs • 15 storage bays

Source: USAF 2008a.

There are three hazardous waste storage facilities (HWSFs) at Travis AFB, including two 90-day hazardous waste accumulation sites (HWASs) and the *Treatment Storage and Disposal Facility* (TSDF) (Table 3-7). The TSDF is used primarily for the storage of waste petroleum products and spent solvents (USAF 2003c). All base-generated waste is eventually transported via contractor to an approved off-base disposal site (USAF 2005).

3.4.2.2 Hazardous Materials

Hazardous materials and petroleum substances at Travis AFB are primarily used to support aircraft fueling and maintenance, AGE, vehicle maintenance, and power production. Hazardous materials and petroleum substances used in these operations include aviation and motor fuels, hydraulic fluids, cleaning solvents, corrosives, paints, soldering materials, compressed gasses, batteries, POL, and transformer oil. The base's *ICP for Oil and Hazardous Substance Spill Prevention and Response* (USAF 2008a) outlines procedures to prepare for and respond to inadvertent releases of hazardous materials and petroleum substances at the base, as well as contingency plans to address unauthorized releases. Hazardous materials use at Travis AFB is tracked by the USAF *Environmental Management Information System* using information obtained on USAF Form 3952 (USAF 2008b).

All incoming hazardous materials are delivered to one of six on-base locations (Table 3-8), two of which are located within 0.25 mile of the *composite outgrant area*. Bulk fuels and other petroleum products are delivered to Travis AFB via a dedicated fuel pipeline (refer to Section 3.4.2.4, *Fuel Delivery and Distribution*) (USAF 2008b).

Table 3-8 Treatment, Storage, and Disposal Facility (TSDF), and Hazardous Waste Accumulation Sites (HWASs) at Travis Air Force Base

Bldg. No.	Facility	Distance from Outgrant Area
777	DGMC Medical Logistics	<0.25 Mile
790	J&J Maintenance Facility	<0.25 Mile
576	Main Hazardous Material Control Center (HAZMART)	0.25 to 1.0 Mile
875	Civil Engineer Logistics HAZMART	0.25 to 1.0 Mile
905	Pest Management	0.25 to 1.0 Mile
5570	Pride Industries Facility ("Pride Yard")	0.25 to 1.0 Mile

Source: USAF 2008b.

3.4.2.3 Stored Fuels and Petroleum Products

The fuel storage and distribution system at Travis AFB is comprised of a network of storage tanks, pipelines, and dispensing systems which primarily support aircraft and vehicle operations. The system also handles oils, lubricants, and other petroleum products utilized for facilities and equipment maintenance, and for emergency power generation (USAF 2003c). The Travis AFB *ICP for Oil and Hazardous Substance Spill Prevention and Response* (USAF 2008a) outlines procedures to prepare for and respond to inadvertent spills of fuels and other petroleum products at the base, and provides summaries of spill histories, inspection and training procedures, and facility

improvement projects. The ICP also provides information on spill prevention, control, and countermeasures, including inspection, maintenance, testing, and training procedures. Storage tank containment and drainages are also described in the ICP.

Storage Capacity

Fuels and other petroleum products at Travis AFB are primarily stored in ASTs, USTs, and fuel transfer and pipeline systems. Portable equipment, emergency USTs, and electrical transformers provide additional storage. On-base storage capacity exceeds 20 million gal or about 651,500 BBL (Table 3-9). The *Bulk Fuels Receiving Facility*, located immediately east of the *composite outgrant area*, is the primary on-base fuel receiving and storage facility, with four large ASTs containing a combined total capacity in excess of 13 million gal. Four *Flight Line Hydrant Systems* also represent a significant portion of on-base fuel storage, with a combined capacity in excess of 2.9 million gal (USAF 2008a).

Table 3-9 Capacity by Storage Type of Fuels and Other Petroleum Products at Travis Air Force Base

Storage Type	Storage Capacity	
	Gallons (gal)	Barrels (BBL)
Aboveground Storage Tanks (ASTs)	16,235,187	523,716
Underground Storage Tanks (USTs)	219,000	7,065
Emergency Spill USTs	135,600	4,374
Flight Line Hydrant/Fuel Transfer System	2,950,500	95,177
Other Pipelines	430,000	13,871
Electrical Equipment[1]	99,604	3,213
Mobile and Portable Tanks	116,600	3,761
Drums and Other Containers[2]	9,905	320
Total Capacity	**20,196,396**	**651,497**

[1] *Electrical Equipment* consists of 685 transformers.
[2] *Drums and Other Containers* include bulk storage and cooking oil containers.
Source: USAF 2008a.

Underground Storage Tanks

USTs are used at Travis AFB for the storage of JP-8, gasoline, biodiesel, and diesel fuels (Table 3-10). There are currently 16 active normal operation USTs at the base, with a combined total storage capacity of 219,000 gal; the storage of gasoline represents approximately 54.8 percent (120,000 gal) of on-base normal operation UST capacity (USAF 2008a, 2008c, 2008d).

Eight additional USTs are reserved for potential emergency spills, including tank overflow and fire suppression deluge collection (Table 3-11); total emergency spill tank capacity is approximately 129,650 gal (USAF 2008a, 2008c, 2008d). One 1,000-gal emergency spill waste oil UST is located at the *Bulk Fuels Receiving Facility*, within 0.25 mile of the *composite outgrant area* (USAF 2008a, 2008c, 2008d). Refer to *Appendix H* for a complete list of active and inactive normal operation and emergency spill USTs at Travis AFB.

Table 3-10 Active Normal Operation Underground Storage Tanks (USTs) at Travis Air Force Base

Product Stored	Number of Tanks	Total Capacity (gal)	Percent of Total Capacity
Gasoline	6	120,000	54.8%
JP-8	6	34,000	15.5%
Biodiesel	1	20,000	9.1%
Diesel	3	45,000	20.5%
TOTAL	**16**	**219,000**	**100.0%**

Sources: USAF 2008a, 2008c, 2008d.

Table 3-11 Active Emergency Spill Underground Storage Tanks (USTs) at Travis Air Force Base

Product Stored	Number of Tanks	Total Capacity (gal)	Percent of Total Capacity
Hydraulic Fluid	3	1,550	1.2%
JP-8	1	6,000	4.6%
Waste Oil	3	2,100	1.6%
N/C	1	120,000	92.6%
TOTAL	**8**	**129,650**	**100.0%**

Sources: USAF 2008a, 2008c, 2008d.

Aboveground Storage Tanks

Travis AFB currently has 111 active ASTs representing a storage capacity in excess of 16 million gal (Table 3-12). JP-8 storage represents 98.7 percent of total capacity. The *Bulk Fuels Receiving Facility* contains four large ASTs with a combined total capacity in excess of 13 million gal, and the four *Flight Line Hydrant Systems* have a combined capacity in excess of 2.9 million gal (USAF 2008a). Diesel fuel storage utilizes the greatest number of ASTs (71 total), but represents only about 0.5 percent of total AST capacity. Diesel is primarily used for emergency power generation (USAF 2008a, 2008c, 2008e).

Table 3-12 Active Aboveground Storage Tanks (ASTs) at Travis Air Force Base

Tank Contents	Number of Tanks	Total Capacity	
		Total Nominal Capacity (gal)	Percentage of Total On-Base Capacity
JP-8	13	15,966,000	98.7%
Diesel	71	83,586	0.5%
Other Petroleum Products[1]	11	85,840	0.5%
Fluids and Solutions[2]	7	31,915	0.2%
Waste Products[3]	9	17,650	0.1%
Total	**111**	**16,184,991**	**100.0%**

[1] *Other Petroleum Products* includes gasoline, engine oil, fuel oil, and lube oil.
[2] *Fluids and Solutions* includes antifreeze, calibrating fluid, deicing fluid, detergent, hydraulic fluid, PD680 dry cleaning solvent, and transmission fluid.
[3] *Waste Products* includes used antifreeze, waste JP-8, waste oil, and wastewater.
Sources: USAF 2008a, 2008c, 2008e.

A total of 13 active ASTs are located within 0.25 mile of the *composite outgrant area*, including the four large ASTs associated with the *Bulk Fuels Receiving Facility* (USAF 2008a, 2008c, 2008d). Refer to *Appendix G* for a complete list of active and inactive ASTs at Travis AFB.

<u>Removed Storage Tanks</u>

Removal of USTs at Travis AFB is conducted in accordance with UFC 3-460-01, *Petroleum Fuel Facilities*, and all applicable Federal, state, and local regulations. According to base records, a total of 139 USTs have been removed from Travis AFB since the 1980s (USACE 2009a; USAF 2003d, 2003e, 2006a, 2008c). The primary cause for tank removal is known or suspected tank leakage which typically resulted in soil or groundwater contamination. Remediation activities are ongoing at multiple sites with known or potential contamination; to date, sites associated with 74 removed USTs have been deemed closed by the San Francisco Regional Water Quality Control Board (RWQCB) (USACE 2009a; USAF 2006a, 2009c).

A total of five USTs have been removed within 0.25 mile of the *composite outgrant area*. A site with three removed USTs located 1,000 feet north of the outgrant area was deemed closed by the San Francisco RWQCB in 2002 (USAF 2003e). A site at the *Bulk Fuels Receiving Facility* formerly containing two USTs is currently under investigation; soil and groundwater at this site have been contaminated with petroleum substances (USACE 2009a; USAF 2009c). Refer to *Appendix I* for a complete list of removed USTs on-base and their current closure status.

3.4.2.4 Fuel Delivery and Distribution

Bulk JP-8 is currently delivered to the *Bulk Fuels Receiving Facility* via the existing approximately 7-mile off-base USAF-owned and operated 8-inch pipeline. The pipeline connects to the 20-inch SFPP Concord-to-Sacramento pipeline via a switching station in Suisun City. SFPP's pipeline transports petroleum products from the SFPP-owned and operated Concord Station, located approximately 20 miles south of Travis AFB. Fuel is typically pumped three to four times a week for an average of 2 hours during each pumping event. Once pumped to the *Bulk Fuels Receiving Facility*, fuel can be distributed to the *Flight Line Hydrant Systems* via two on-base USAF-owned and operated 8-inch pipelines (USAF 2008a).

Commercial tanker trucks are responsible for the delivery of other base fuels, including gasoline, biodiesel, and diesel fuels (USAF 2008a).

3.4.2.5 Fuel Containment and Pollution Countermeasures

<u>Secondary Containment</u>

Secondary containment at fuel storage and transfer sites controls discharges and is designed to contain spills on-site, thereby reducing the likelihood of offsite watershed or groundwater containment. At Travis AFB, secondary containment has been installed around all ASTs located at the *Bulk Fuels Receiving Facility* and the *Flight Line Hydrant*

Systems. Secondary containment capacity at the Bulk Fuels Receiving Facility is approximately 4 million gal in excess of tank capacity. Secondary containment capacity at each of the Flight Line Hydrant Systems is at least 150 percent of tank capacity (USAF 2008a). Table 3-13 presents a summary of on-base secondary containment system capacity. Management and monitoring of on-base secondary containment areas to ensure the protection of human health and the environment is outlined in the Travis AFB *Stormwater Pollution and Prevention Plan* (SWPPP) (USAF 2007a) and the base's ICP (USAF 2008a).

Table 3-13 Secondary Containment at the Bulk Fuels Receiving Facility and Flight Line Hydrant Systems, Travis Air Force Base

Location	Distance from Outgrant Area	No. of Tanks	Total Tank Capacity (gal)	Total Secondary Containment Volume (gal)	Total Excess Secondary Containment Volume (gal)
Bulk Fuels Receiving Facility (Area F)	<0.25 Mile	4	13,020,000	17,111,985	4,091,985
Flight Line Hydrant System (Area C)	0.50 to 1.0 Mile	2	840,000	1,237,757	397,757
Flight Line Hydrant System (Area G)	0.50 to 1.0 Mile	2	420,000	1,010,394	590,394
Flight Line Hydrant System (Area H)	0.50 to 1.0 Mile	2	840,000	1,337,158	497,158
Flight Line Hydrant System (Area B)	>1.0 Mile	2	840,000	1,337,158	497,158

Source: USAF 2008a.

Oil/Water Separators

Oil/water separators (OWSs) are used to separate oils, fuels, sand, and grease from wastewater and to prevent contaminants from entering sanitary sewer and stormwater drainage systems. OWSs are installed at Travis AFB near aircraft and vehicle washracks, and at maintenance and refueling areas. There are currently 21 active OWSs at the base, including 19 for normal operations and two reserved for emergency scenarios. 12 additional on-base OWSs are inactive, and 5 additional OWSs have been removed (USAF 2007b, 2008a). Management and monitoring of on-base OWSs to ensure the protection of human health and the environment is outlined in the base's *SWPPP* (USAF 2007a). Refer to *Appendix J* for a complete list of active, inactive, and removed OWSs at Travis AFB.

3.5 WATER RESOURCES

3.5.1 Definition of Resource

Water resources presented in this section include surface and groundwater resources, and floodplains. The quality and availability of surface and groundwater and potential for flooding are addressed in this section. Surface water resources comprise lakes, rivers, streams, and wetlands and are important for a variety of reasons including economic,

ecological, recreational, and human health. Groundwater comprises the subsurface hydrologic resources of the physical environment and is an essential resource in many areas; groundwater is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater properties are often described in terms of depth to aquifer, aquifer or well capacity, water quality, and surrounding geologic composition. Other issues relevant to water resources include watershed areas affected by existing and potential runoff and hazards associated with 100-year floodplains. Floodplains are belts of low, level ground present on one or both sides of a stream channel and are subject to either periodic or infrequent inundation by flood water. Inundation dangers associated with floodplains have prompted Federal, state, and local legislation that limit development in these areas largely to recreation and preservation activities.

Wetlands are defined by the USACE and the USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR § 328.3 [b] [1984]). Wetlands provide a variety of functions including groundwater recharge and discharge; flood flow alteration; sediment stabilization; sediment and toxicant retention; nutrient removal and transformation; aquatic and terrestrial diversity and abundance; and uniqueness. Jurisdictional waters of the United States, including wetlands, are those subject to regulatory authority under Section 404 of the CWA and EO 11990, *Protection of Wetlands*.

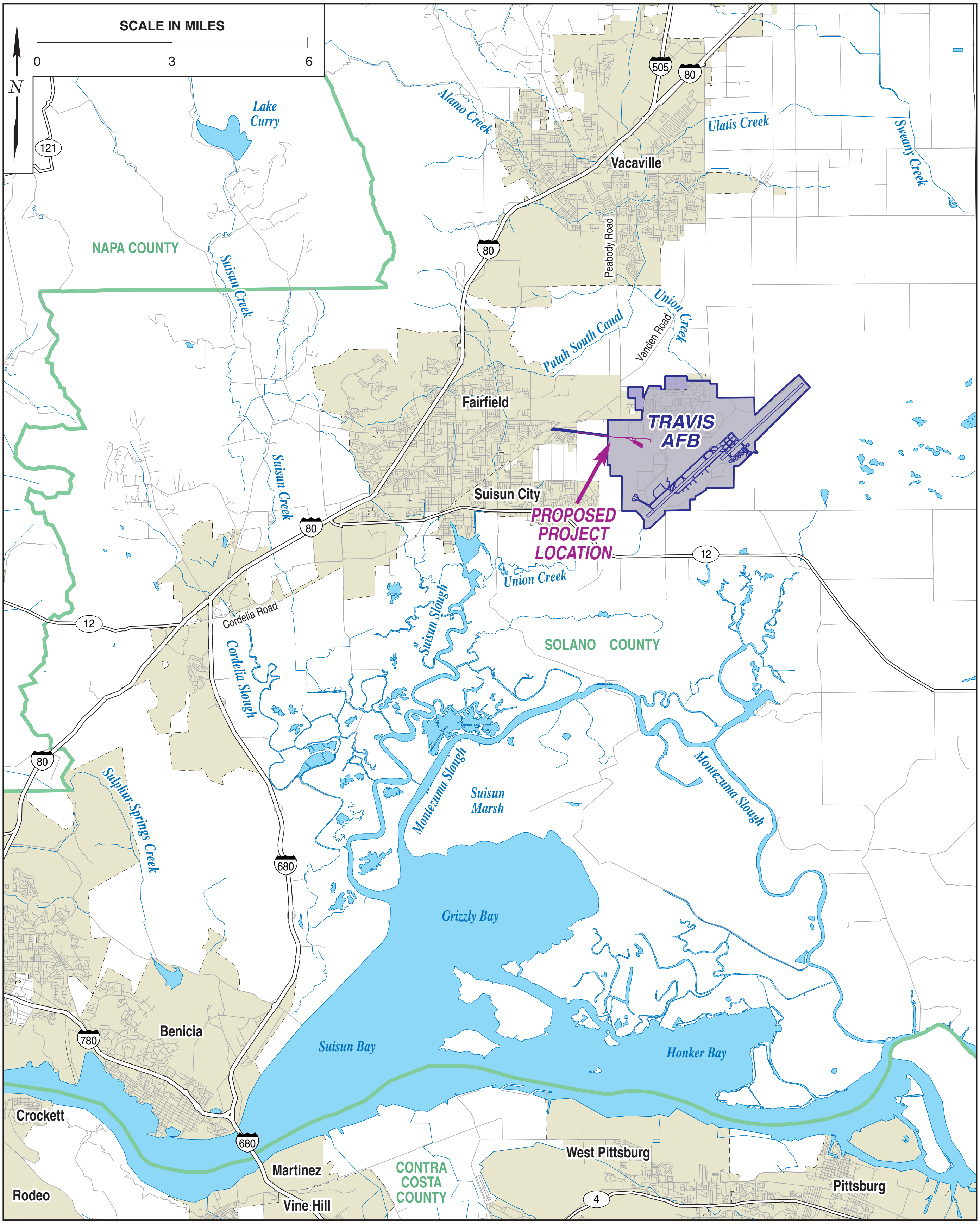
Vernal pools are wetlands which occur in shallow earthen depressions where underlying soil or bedrock prevents drainage, resulting in seasonal ponding habitats which fill during the rainy season, but desiccate during the dry season. *Vernal swales* are stream habitats which fill or desiccate based upon seasonal rainfall. Vernal pools and swales provide essential habitat for the development of many native plants, invertebrates, and amphibian species.

3.5.2 Existing Conditions

3.5.2.1 Regional Setting

Surface Water

Solano County has an extensive network of creeks, sloughs, bays, and marshes that flow into one of two drainage provinces, both of which eventually flow into the Pacific Ocean (Figure 3-1) (Solano County 2006a). Surface water from eastern Solano County flows into the *Delta Drainage Province*. This province is associated with the Sacramento/San Joaquin River Delta, an approximately 1,100-square mile inland river delta and estuary formed by the confluence of the Sacramento and San Joaquin Rivers. Solano County has over 150 miles of delta sloughs, channels, and bays, including the Suisun and Montezuma Sloughs; the Suisun, Honker, and Grizzly Bays; and, Suisun Marsh, a brackish-water estuary totaling over 116,000 acres (Solano County 2006a).



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Surface Water Resources in the Vicinity of Travis Air Force Base

FIGURE 3-1

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Surface water from western Solano County flows into the *San Francisco Bay Drainage Province*. Associated surface water features in the County include the Napa River mouth and portions of San Pablo Bay (Solano County 2006a).

The Union Creek watershed is the primary surface water resource in the vicinity of Travis AFB. The watershed originates approximately 3 miles north of the base and terminates approximately 1.6 miles southwest of the base at Hill Slough. A second watershed associated with Denverton Creek is primarily located east of the base; this watershed flows southeast into Denverton Slough. Hill and Denverton Sloughs are both part of the Suisun Marsh estuary system (Solano County 2006a; USAF 2003a).

<u>Groundwater</u>

There are four major groundwater basins in Solano County. The Suisun-Fairfield Valley Basin is the second-largest, encompassing an approximate area of 133,600 acres underlying the central portion of the County, including beneath Travis AFB. Thick sequences of highly-impermeable marine sedimentary rock underlying the basin are classified as non-water-bearing. Water yields from the basin are generally low and of poor quality; consequently, the majority of water supplied to the cities of Fairfield and Suisun City is imported from Lake Berryessa Reservoir, located approximately 20 miles northwest of Travis AFB in nearby Napa County (Geological Society of America [GSA] 1999; Solano County 2006a, 2007).

In the general vicinity of Travis AFB, California Department of Water Resources (DWR) monitoring wells have recorded average depth to groundwater from approximately 5 to 30 feet below ground surface (bgs) (DWR 2008). Groundwater recharge occurs from infiltration of rainfall and through surface water runoff (Solano County 2006a).

<u>Floodplains</u>

Federal Emergency Management Agency (FEMA) *Flood Insurance Rate Maps* (FIRMs) indicate that the majority of the 100-year floodplains in Solano County are associated with the Suisun Marsh and Sacramento/San Joaquin River Delta areas. Additional floodplains, associated with the flooding of creeks and streams, are found in low-lying valley areas throughout the northeast part of the County (Solano County 2007). FEMA FIRMs indicate minor areas of 100-year floodplains south and east of the base associated with creek and stream flooding (FEMA 1982, 1988, 1991a, 1991b, 1991c, 1991d).

<u>Wetlands</u>

Wetlands represent 450,000 acres, or approximately 0.4 percent of the land area in California. In addition, 658,000 acres of flooded rice fields exist throughout the State. It is estimated that over 91 percent of the original wetlands acreage in the State has been lost since 1850 (U.S. Geological Service [USGS] 1996, 1997).

Estuarine and marine wetlands predominate in the Sacramento/San Joaquin River Delta and Suisun Marsh areas of southern Solano County (USFWS 2007). The Suisun Marsh is the largest contiguous estuarine wetland in the continental United States, totaling over

116,000 acres (Solano County 2006a). The Solano-Colusa Vernal Pool Region encompasses a majority of the County's central and eastern areas. Pools in the region are often comprised of both small playas and hog-wallow depressions, and may occur singly or in small groups. Typically, pools are alkaline and may display whitish saline deposits when dry (USAF 2007c).

Vernal pools are the most common wetland type found in the vicinity of Travis AFB. These vernal pools are included in the Northern Claypan Vernal Pool Series (Sawyer and Keeler-Wolf 1995). Vernal pool hydrology is determined primarily by timing and amount of rainfall during the wet season, along with basin topography. The water-restrictive layer in these vernal pools is formed by a surface clay layer rather than a duripan type subsurface structure (Williamson et al. 2005). Multiple freshwater emergent wetlands associated with sloughs are located approximately 2 miles south of the base, and the Suisun Marsh is located approximately 4 miles to the south (USAF 2007c; USFWS 2007).

3.5.2.2 Travis Air Force Base

<u>Surface Water</u>

The Union Creek watershed is the primary surface water feature at Travis AFB (Figure 3-2). Union Creek diverges into east and west branches approximately 1.0 mile north of the base. The east branch of Union Creek enters at the northeast corner of the base and flows into Duck Pond, located near the Travis AFB North Gate. The east branch proceeds south through an underground channel, eventually emerging as a riparian corridor adjacent to the base's south perimeter. The west branch of Union Creek enters the base near the northwest boundary of the housing area, and then proceeds south through a combination open ditch/ belowground channel. The west and east branches of Union Creek eventually rejoin near the base's southern perimeter and the creek exits the base southward toward Hill Slough (USAF 2003a).

McCoy Creek, located near Runway 3L/21R, is a smaller drainage channel which receives water from on-base storm drains. The creek flows into the east branch of Union Creek (USAF 2003c). Portions of the Denverton Creek watershed are located in the easternmost part of the base, near the end of Runway 3R/21L. All drainages associated with this watershed flow off-base in a southeast direction (USAF 2007c).

Duck Pond, a man-made shallow-water lake located adjacent to the base's northern gate, is the primary body of water at Travis AFB. The pond serves as a wildlife habitat and recreational area for nearby residences. Additional ponds are located in the southeast corner of the base, near the airfield, and near residential areas in the northwest portion (USAF 2003a).

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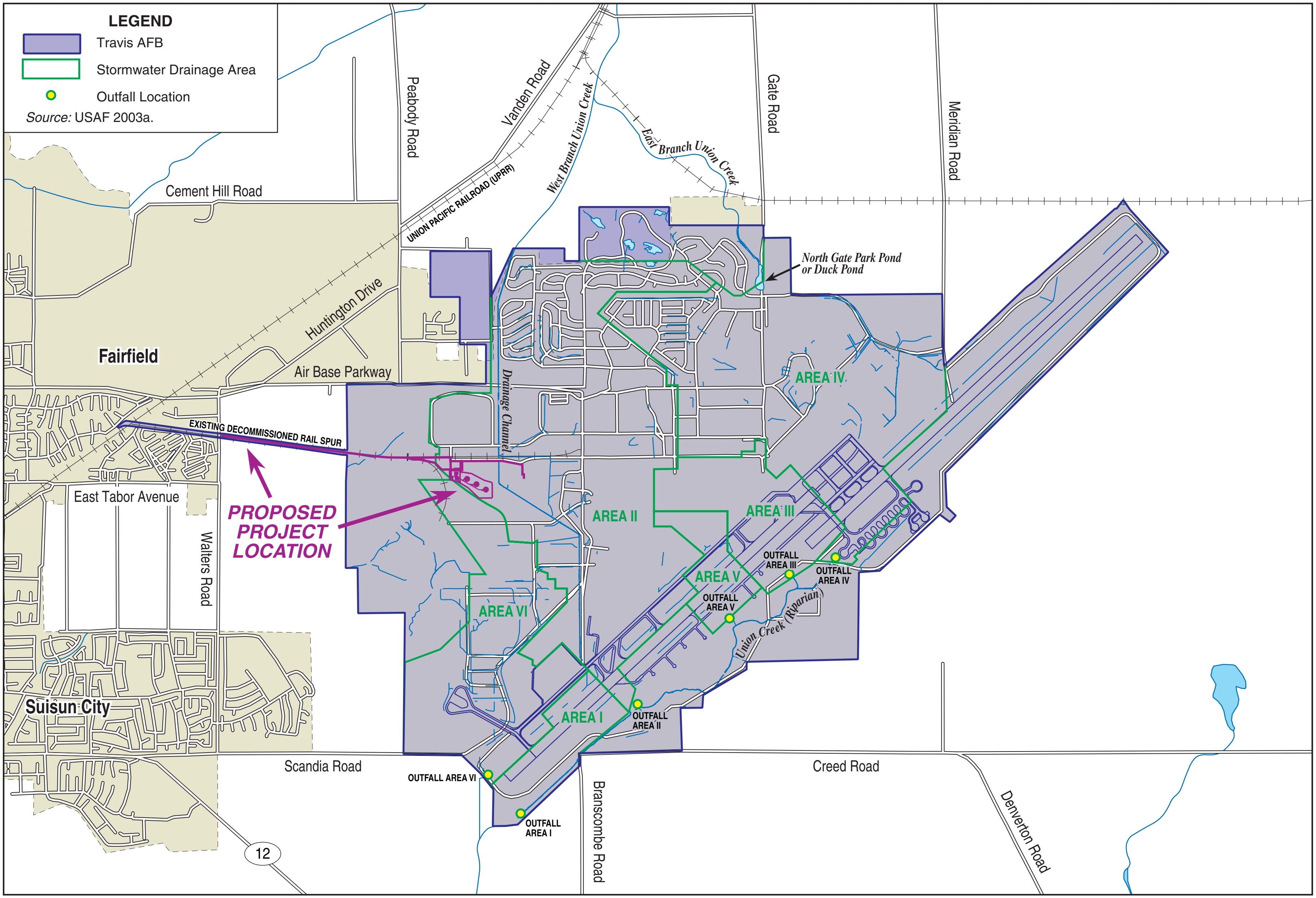

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Surface Water Resources and Drainage Areas at Travis Air Force Base

FIGURE
3-2

The stormwater drainage system at Travis AFB is comprised of a network of underground storm drains and aboveground ditches divided into six drainage areas (refer to Figure 3-2). All on-base drainage areas eventually empty into the Union Creek watershed (USAF 2003a). The California SWRCB has issued *National Pollutant Discharge Elimination System General Permit Number CAS000001* for industrial stormwater at Travis AFB. The base also operates under a *SWPPP* (USAF 2007a) which outlines engineering and management strategies designed to enhance the quality of the base's stormwater discharges, especially releases related to industrial and construction activities.

<u>Groundwater</u>

Groundwater deposits in the vicinity of Travis AFB consist primarily of coarse-grained sand and gravel within alluvial sediments; bedrock beneath these sediments does not hold significant quantities of groundwater. Average depth to groundwater varies from 5 to 30 feet bgs. Groundwater flow is to the south, with eventual discharge into the Suisun Marsh. The quantity and quality of groundwater near Travis AFB is generally limited; therefore, the on-base water supply is obtained from off-base wells or through municipal sources (USAF 2003c).

<u>Floodplains</u>

FEMA FIRMs do not indicate the presence of 100-year floodplains at Travis AFB (USAF 2003a).

<u>Wetlands</u>

Vernal pools and vernal swales comprise a majority of the wetlands at Travis AFB (Figure 3-3). A total of 322 pools have been identified at the base; the largest concentrations are in the northwest portion of the base, near the Aero Club, and in undeveloped areas along the base's north, south, and east perimeters. About 50 acres of wetlands are located in the 3-mile riparian corridor associated with the east branch of Union Creek. The creek's west branch is a constructed channel which contains limited wetland vegetation along its edges (USAF 2003a). Refer to Section 3.6, *Biological Resources* for information about biological resources associated with on-base wetlands and vernal pools.

Wetlands management at Travis AFB is outlined in the base's *INRMP* (USAF 2003a). The plan addresses the preservation of wetlands through the use of buffers around wetland habitats, as well as creating and maintaining a centralized wetland inventory database.

3.5.2.3 Area of Potential Effect (APE)

The APE encompasses approximately 38.29 acres in the western part of Travis AFB (Figure 3-4). The APE is comprised of all areas that would be temporarily disturbed by implementation of the Proposed Action or project alternatives, and/or areas that would be located in the permanent project footprints associated with implementation of these actions.

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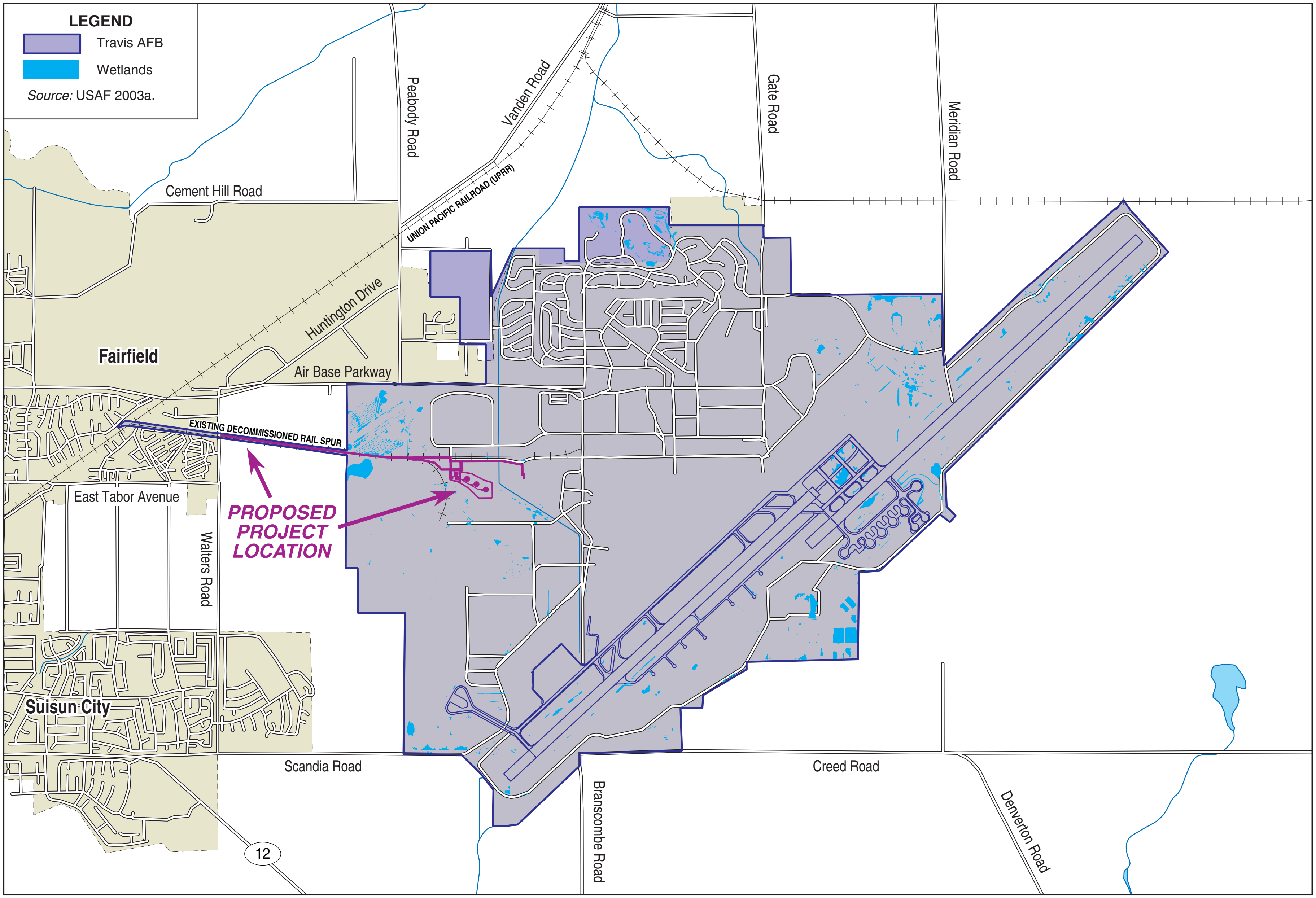

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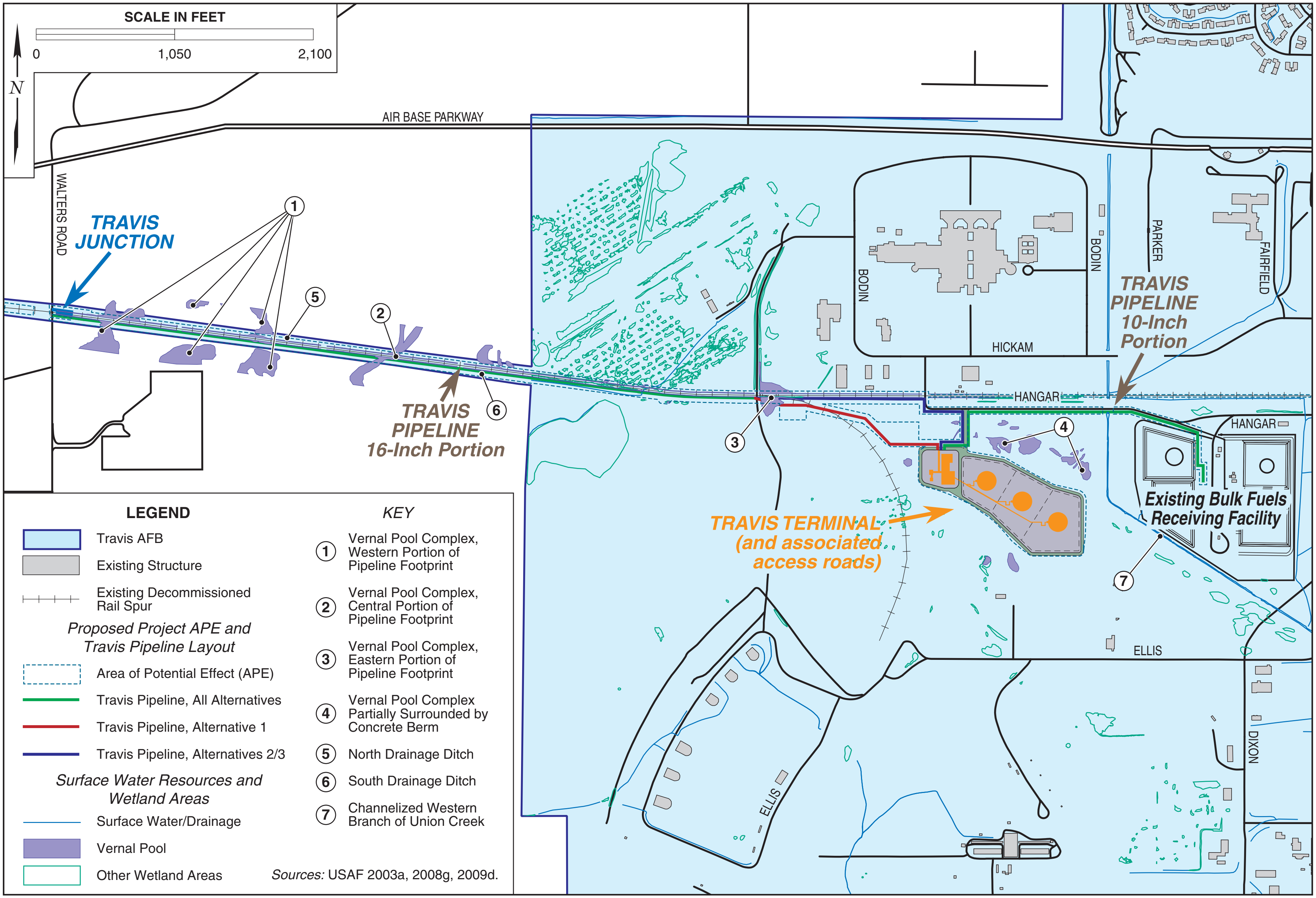
Wetland Resources at Travis Air Force Base

FIGURE 3-3



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Surface Water Resources and Wetlands in the Vicinity of the Proposed Project Area of Potential Effect (APE)

FIGURE 3-4

Surface Water

The APE is located in the westernmost part of the Union Creek watershed. Surface water resources include the channelized west branch of Union Creek, which passes through the east part of the APE, and seasonally inundated drainage ditches that run the entire length of the decommissioned rail spur on the north and south sides of the track. Surface water flow in the vicinity of the proposed Travis Terminal footprint and areas to the east is primarily toward Union Creek. Surface water flow in areas west of the footprint is to the west and southwest, primarily along the drainage ditches (USAF 2009a). Refer to Figure 3-4 for surface water resources in the vicinity of the APE.

Groundwater

A 2009 geotechnical investigation evaluated groundwater in the APE. Three borings along the proposed Travis Pipeline footprint encountered groundwater at depths of 5 to 7.5 feet bgs. Nine borings in the proposed Travis Terminal footprint respectively encountered groundwater at depths of 10 to 15.5 feet bgs and 24 to 27 feet bgs in the northwest and southeast parts of the footprint (USAF 2009e). Groundwater flow is to the south in the entire APE (USAF 2003c).

Three inactive groundwater monitoring wells are located in the APE within the proposed Travis Terminal footprint. The wells vary in depth from 25 to 43 feet bgs and were installed in 1996 as part of a *Remedial Investigation* (*RI*) of *Environmental Restoration Program* (ERP) Site LF044, *Landfill X* (refer to Section 3.12.2.2, *Environmental Restoration Program*) (USAF 1997, 2002). One additional inactive monitoring well associated with the ERP Site LF044 *RI* is located southwest of the APE (USAF 1997, 2002).

Wetlands

Reconnaissance of the APE on 18 March 2008 identified three large vernal pool complexes on the north and south sides of the proposed Travis Pipeline footprint (USAF 2008f). These wetland areas encroach into the APE at locations where drainage culverts exist beneath the tracks, thereby creating a hydrologic connection between the north and south sides of the track. In addition, a vernal pool complex partially surrounded by a concrete berm is located north of the proposed Travis Terminal footprint (USAF 2003a). Refer to Figure 3-4 for the location of wetland areas in the vicinity of the APE and Section 3.6, *Biological Resources*, for information on biological resources associated with these wetlands.

3.6 BIOLOGICAL RESOURCES

3.6.1 Definition of Resource

Biological resources include native or naturalized plants and animals and the habitats in which they occur. Sensitive biological resources are defined as those plant and animal species listed as threatened or endangered, or proposed as such, by the USFWS or the California Department of Fish and Game (CDFG). The ESA of 1973 and the *California Endangered Species Act* (CESA) protect listed species against killing, harming,

harassment, or any action that may damage their habitat. Species of concern are not protected by law, but could become listed and protected at any time.

Migratory birds, as listed in 50 CFR § 10.13, are ecologically and economically important to the U.S., and recreational activities such as bird watching, studying, and feeding are practiced by many Americans. The *Migratory Bird Treaty Act* (MBTA) was enacted to protect migratory birds from capture, pursuit, hunting, or removal from natural habitat. Over 800 species are currently protected under the MBTA. In 2001, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued to ensure that Federal agencies consider environmental effects on migratory bird species and, where feasible, implement policies and programs which support the conservation and protection of migratory birds.

3.6.1.1 Biological Assessment (BA)

A *BA* was prepared in 2009 to assess biological resources in the APE previously described in Section 3.5, *Water Resources* (USAF 2009d). Information in the BA is presented throughout the discussions below. Refer to *Appendix N* for the complete BA.

3.6.2 Existing Conditions

3.6.2.1 Regional Setting

The varied geological, hydrological, and climatic conditions of Solano County support a grand diversity of habitats and species. The *valley floor grassland and vernal pool* habitat comprises most of the County's valley floor. The *Inner Coast Range* habitat dominates the County's mountainous western perimeter. The *coastal marsh* habitat is located throughout the San Pablo Bay and Suisun Marsh areas. Freshwater resources and adjacent areas are part of the *riparian, stream, and freshwater marsh* habitat. *Agricultural areas* located in the County's central and eastern portions also comprise a significant habitat (Solano County 2006b).

<u>Vegetation</u>

Vegetation in Solano County varies greatly by habitat type. The *valley floor grassland and vernal pool* habitat contains large swaths of grasslands intermixed with claypan and hardpan vernal pools. Historically, this habitat comprised most of the County's valley floor, but large portions have been replaced with agriculture and urban development. The *Inner Coast Range* habitat contains a mix of oak woodlands and savannas, brush/chaparral, grasslands, and evergreens. The *riparian, stream, and freshwater marsh* habitat hosts a variety of scrub-shrub and woodland areas, while *coastal marsh* vegetation is limited to perennial grasslands and herbaceous species. *Agricultural areas* are comprised of orchards, row crops, and irrigated pastures (Solano County 2006b).

<u>Wildlife</u>

Each habitat in Solano County harbors a diversity of wildlife species. The *valley floor grassland and vernal pool* habitat is home to a large number of songbird species, as well as snakes, lizards, hawks, eagles, owls, mice, raccoons, and coyotes. In the *Inner Coast*

Range habitat, oak woodlands provide a key habitat for many species, including amphibians and reptiles. Proximity to water allows the *riparian, stream, and freshwater marsh* and *coastal marsh* habitats to support numerous birds, fish, amphibians, and reptiles. Orchards in *agricultural areas* provide a valuable nesting place for certain birds (Solano County 2006b).

Special Status Species

Special status plant and animal species are those listed as rare, threatened, or endangered by the USFWS *ESA* or the CDFG *CESA* (CDFG 2008; USFWS 2008). Plant species native to California may be further listed on the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plants (IREP)* (CNPS 2008). A total of 83 special-status species are listed for Solano County (Solano County 2006b), as summarized in *Appendix K*.

3.6.2.2 Travis Air Force Base

Vegetation

The land occupied by Travis AFB originally contained three distinct vegetative habitats: perennial grassland plains; mixed oak and bunchgrass uplands; and, riparian areas comprised of cottonwoods, willows, tules, and reeds. Mexican and European settlement during the nineteenth century led to extensive changes in the natural vegetative habitat through grazing and agricultural activities, and the planting of non-native species. Development of the base since 1942 has further modified vegetative conditions as numerous non-native tree and grass species have been planted for landscaping purposes (USAF 2003a). There are currently four primary vegetative habitats at Travis AFB, as outlined below:

Annual grasslands encompass over 1,700 acres of land at Travis AFB, including a majority of the base's western portion. Nonnative species dominate, including filaree (*Erodium botrys*), Harding grass (*Phalaris aquatica*), Italian ryegrass (*Lolium multiflorum*), mouse-tail fescue (*Vulpia myuros* var. *myuros*), ripgut brome (*Bromus rigidus*), soft chess (*Bromus hordeaceus*), and wild oat (*Avena fatua*) (USAF 2003a).

Early successional/ruderal areas consist of recently disturbed lands which host vegetation accustomed to distressed conditions. A number of areas in the base's southeast portion are considered *early successional/ruderal*; vegetation primarily consists of species such as blue gum eucalyptus (*Eucalyptus globulus*), coyote brush (*Baccharus pilularis*), yellow star thistle (*Centaurea solstitialis*), and some annual grasses such as ripgut brome and wild oat (USAF 2003a).

Riparian zones are habitats adjacent to riverine areas which support vegetation adapted to continuous changes in water levels. A majority of the base's riparian zones are associated with the east branch of Union Creek, including corridors south of the airfield and north of Duck Pond. Common vegetation includes arroyo willow (*Salix lasiolepis*), creeping wild rye (*Leymus triticoides*), red willow (*Salix laevigata*), and saltgrass (*Distichlis* spp.) (USAF 2003a).

Urban landscapes comprise about 300 acres of the base. These areas primarily consist of irrigated lawns and nonnative ornamental landscaping associated with housing and other built development. In general, habitat areas are disturbed and only support wildlife accustomed to high levels of human activity (USAF 2003a).

Wildlife

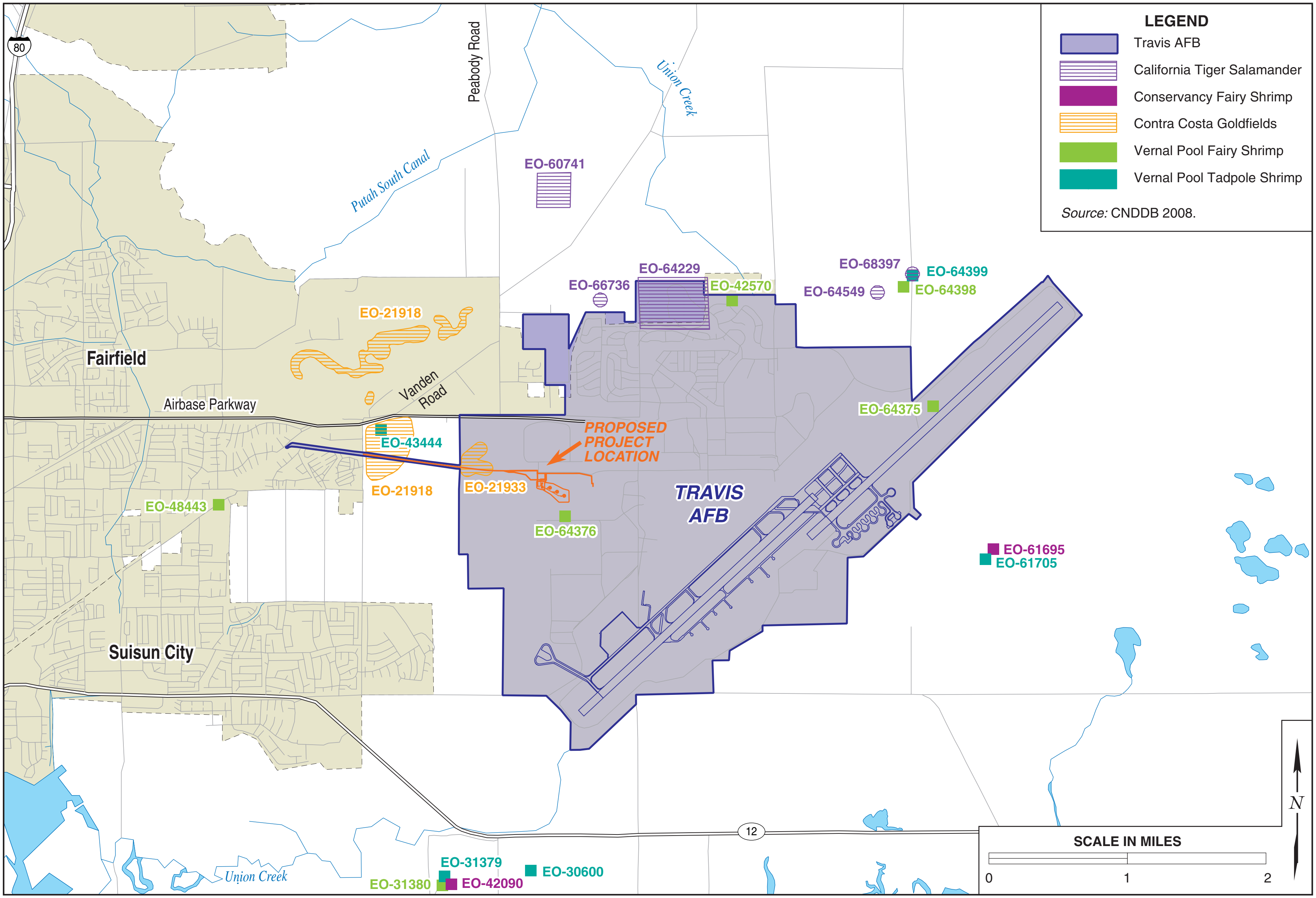
Vegetative habitats at Travis AFB support numerous mammals, birds, reptiles, fish, amphibians, and aquatic invertebrates. Common species include the deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), western harvest mouse (*Reithrodontomys megalotis*), black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Spermophilus beecheyi*), mallard (*Anas platyrhynchos*), red-winged blackbird (*Agelaius phoeniceus*), northwestern fence lizard (*Sceloporus occidentalis*), and Pacific gopher snake (*Pituophis melanoleucus*). The presence of each species varies by habitat and level of human disturbance (USAF 2003a).

A large number of species have been observed or have the potential to occur at Travis AFB. With regard to mammals, 29 total species may potentially occur at the base; a total of 19 species (six small, 13 large) have been directly observed or identified by sign (e.g., nests, tracks, etc.). An estimated 153 bird species have the potential to occur at the base; of these, 61 have been observed at the base and 35 species are confirmed as nesting on base property. A total of six amphibian, 13 reptile, and 9 fish species are known to occur at the base. Further, approximately 33 taxa of invertebrates have been observed (USAF 2003a).

Special-Status Species

A total of 29 special-status species have been identified at Travis AFB or have the potential to occur on base property, including 15 plants, five birds, one reptile, two amphibians, and six invertebrates (Solano County 2006b; USAF 2003a). Table 3-14 presents a complete list of the special-status species which have the potential to occur at Travis AFB, with species observed at the base noted in **bold**.

Eight special-status species have been identified at Travis AFB. One plant species, the Contra Costa goldfields (*Lasthenia conjugens*), is listed as *endangered* under the ESA. Three additional plant species are considered rare or endangered in California, but are not legally protected under the ESA or CESA: alkali milk vetch (*Astragalus tener* var. *tener*), brittlescale (*Atriplex depressa*), and San Joaquin saltbush (*Atriplex joaquiniana*) (USAF 2003a). Two bird species, the western burrowing owl (*Athene cunicularia hypugea*) and loggerhead shrike (*Lanius ludovicianus*), are listed as *species of concern* under the CESA. One amphibian, the California tiger salamander (*Ambystoma californiense*), is listed as a *threatened* species under the ESA. The vernal pool fairy shrimp (*Branchinecta lynchi*), an aquatic invertebrate, is also listed as *threatened* under the ESA (USAF 2003a). Refer to Table 3-14 for detailed information on the habitat preferences of each of these special-status species. Figure 3-5 presents known occurrences of special-status species at or in the general vicinity of Travis AFB, as cataloged in the California Natural Diversity Database (CNDDB).



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Known Occurrences of Special-Status Species at or in the Vicinity of Travis Air Force Base as Cataloged in the California Natural Diversity Database (CNDDB)

FIGURE 3-5

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

Table 3-14 Special-Status Species That Have the Potential[1] to Occur at Travis Air Force Base (Observed Species Noted in Bold Text)

Common Name	Scientific Name	Listing			Habitat Preference
		ESA	CESA	IREP	
Plants					
Alkali milk vetch	***Astragalus tener* var. *tener***	**NL**	**NL**	**N1B**	**Seasonally moist areas, such as alkaline vernal pools, grasslands, playas; elevations below 500 ft.**
Heartscale	*Atriplex cordulata*	NL	NL	N1B	Alkaline, sometimes sandy soils; elevations below 600 ft.
Brittlescale	***Atriplex depressa***	**NL**	**NL**	**N1B**	**Alkaline and clay soils; elevations below 500 ft.**
San Joaquin spearscale	***Atriplex joaquiniana***	**NL**	**NL**	**N1B**	**Seasonally wet habitats, including alkaline grasslands; elevations below 1,000 ft.**
Hispid bird's beak	*Cordylanthus mollis* spp. *Hispidus*	NL	NL	N1B	Alkaline flats and meadows; elevations below 50 ft.
Recurved larkspur	*Delphimium recurvatum*	NL	NL	N1B	Alkaline soils and grasslands; large, deep vernal pools.
Dwarf downingia	*Downingia pusilla*	NL	NL	N2	Drying edges of vernal pools; valley grasslands; stock ponds.
Fragrant fritillary	*Fritilaria liliacea*	NL	NL	N1B	Coastal scrub, valleys, and foothill grasslands.
Adobe lily	*Fritillaria pluriflora*	NL	NL	N1B	Chaparral habitat, cismontane woodlands, valley and foothill alkaline grasslands.
Boggs lake Hedge-hyssop	*Gratiola heterosepala*	NL	SE	N1B	Drying borders of vernal pools, stock ponds, and lowland.
Contra Costa goldfields	***Lasthenia conjugens***	**FE**	**NL**	**N1B**	**Drying borders of vernal pools and seasonally wet grasslands.**
Legenere	*Legenere limosa*	NL	NL	N1B	Vernal pools and seasonally wet areas in valley grassland habitat.
Colusa grass	*Neostapfia colusana*	FT	SE	N1B	Vernal pools, vernal lakes, and playa-type pools.
Showy Indian clover	*Trifolium amoenum*	FE	NL	N1B	Valleys and foothill grasslands.
Crampton's tuctoria (Solano grass)	*Tuctoria mucronata*	FE	SE	N1B	Vernal pools.
Birds					
Short-eared owl	*Asio flammeus*	FSC	CSC	N/A	Grasslands.
Western burrowing owl	***Athene cunicularia hypugea***	**NL**	**CSC**	**N/A**	**Grasslands; sometimes found in man-made structures.**
Swainson's hawk	*Buteo swainsoni*	NL	ST	N/A	Grasslands.
White-tailed kite	*Elanus leucurus*	NL	FPS	N/A	Grasslands.
Loggerhead shrike	***Lanius ludovicianus***	**NL**	**CSC**	**N/A**	**Grasslands and open meadows.**

Table 3-14 Special-Status Species That Have the Potential[1] to Occur at Travis Air Force Base (Observed Species Noted in Bold Text) (continued)

Common Name	Scientific Name	Listing			Habitat Preference
		ESA	*CESA*	*IREP*	
Reptiles					
Giant garter snake	*Thamnophis gigas*	FT	ST	N/A	Riparian habitats, small pools, and drains.
Amphibians					
California tiger salamander	***Ambystoma californiense***	**FT**	**NL**	**N/A**	**Grasslands, temporary ponds, and open oak woodlands.**
California red-legged frog	*Rana aurora draytonii*	FT	NL	N/A	Streams and marshes; sometimes in ephemeral ponds and grasslands.
Invertebrates					
Conservancy fairy shrimp	*Branchinecta conservatio*	FE	NL	N/A	Large playa-type vernal pools.
Vernal pool fairy shrimp	***Branchinecta lynchi***	**FT**	**NL**	**N/A**	**Vernal pools and temporary aquatic habitats.**
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	NL	N/A	Only occur in elderberry trees.
Delta green ground beetle	*Elaphrus viridis*	FT	NL	N/A	Near vernal pools.
Ricksecker's water scavenger beetle	*Hydrochara rickseckeri*	FSC	NL	N/A	In vernal pools.
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	NL	N/A	Vernal pools and a variety of temporary aquatic habitats, including rice fields.

[1] Species that have the *potential* to occur at Travis AFB are defined as those which have been observed in the general vicinity of the base and for which suitable habitat exists at the base.

FE = Federal endangered FT = Federal threatened FSC = Federal species of concern

SE = state endangered ST = state threatened CSC = state species of concern

N1B = considered rare or endangered in California; not legally protected under the ESA or CESA

N2 = considered rare or endangered in California, but more common elsewhere

NL = not listed N/A = not applicable

Sources: Solano County 2006b; USAF 2003a.

Wetland Habitats

Wetland habitats at Travis AFB include *vernal pools and swales*, *wetland meadows*, and *freshwater wetlands* associated with creeks and ponds.

Vernal pools and vernal swales comprise the majority of wetlands at the base (refer to Figure 3-3 in Section 3.5, *Water Resources*). A total of 322 pools have been identified at the base; the largest concentrations are in the northwest portion of the base, near the Aero Club, and in undeveloped areas along the base's north, south, and east perimeters. On-base vernal pools and swales support a variety of plants species, including Pacific meadow foxtail (*Alopecurus saccatus*), hairgrass (*Deschampsia danthonioides*), calicoflower (*Downingia* spp.), spike rush (*Eleocharis macrostachya*), coyote thistle (*Eryngium vaseyi*), meadow barley (*Hordeum brachyantherum*), flowering quillwort (*Lilaea scilloides*), hyssop loosestrife (*Lythrum hyssopifolia*), popcorn flower (*Plagiobothrys* spp.), and round woolly marbles (*Psilocarphus tenellus* var. *globiferus*).

Special-status plant species such as the alkali milk vetch, Contra Costa goldfields, and San Joaquin spearscale are supported as well. Vernal pools and swales are also a habitat for numerous invertebrates and may potentially contain suitable habitat for the special-status invertebrate species vernal pool fairy shrimp (USAF 2003a).

Wetland meadows are depressional grassland areas which are typically wet throughout the rainy season. The habitat is characterized by grazing and/or human maintenance and generally supports plant species adapted to high levels of disturbance. Italian ryegrass is the dominant species; calicoflower, coyote thistle, filaree, Pacific meadow foxtail, popcorn flower, ripgut brome, and wild oat are also prevalent (USAF 2003a).

Freshwater wetlands associated with creeks and ponds are located throughout Travis AFB. Habitat examples include the riparian areas along the perimeter of Duck Pond and the riparian zones associated with the east branch of Union Creek, such as the corridors south of the airfield and north of Duck Pond. The channelized west branch of Union Creek is also abutted by areas of freshwater wetland habitat. Vegetation common to freshwater wetlands includes arroyo willow, creeping wild rye, red willow, and saltgrass. Plant species adapted to high levels of disturbance are also prevalent, including Italian ryegrass, calicoflower, coyote thistle, filaree, Pacific meadow foxtail, popcorn flower, ripgut brome, and wild oat (USAF 2003a).

Natural Resources Management and Preservation

Travis AFB is geographically divided into seven *Natural Resource Management Units* (NRMUs) based upon the types of activities, both current and proposed, occurring in the management unit, as well as the presence of any habitats or resources (Figure 3-6).

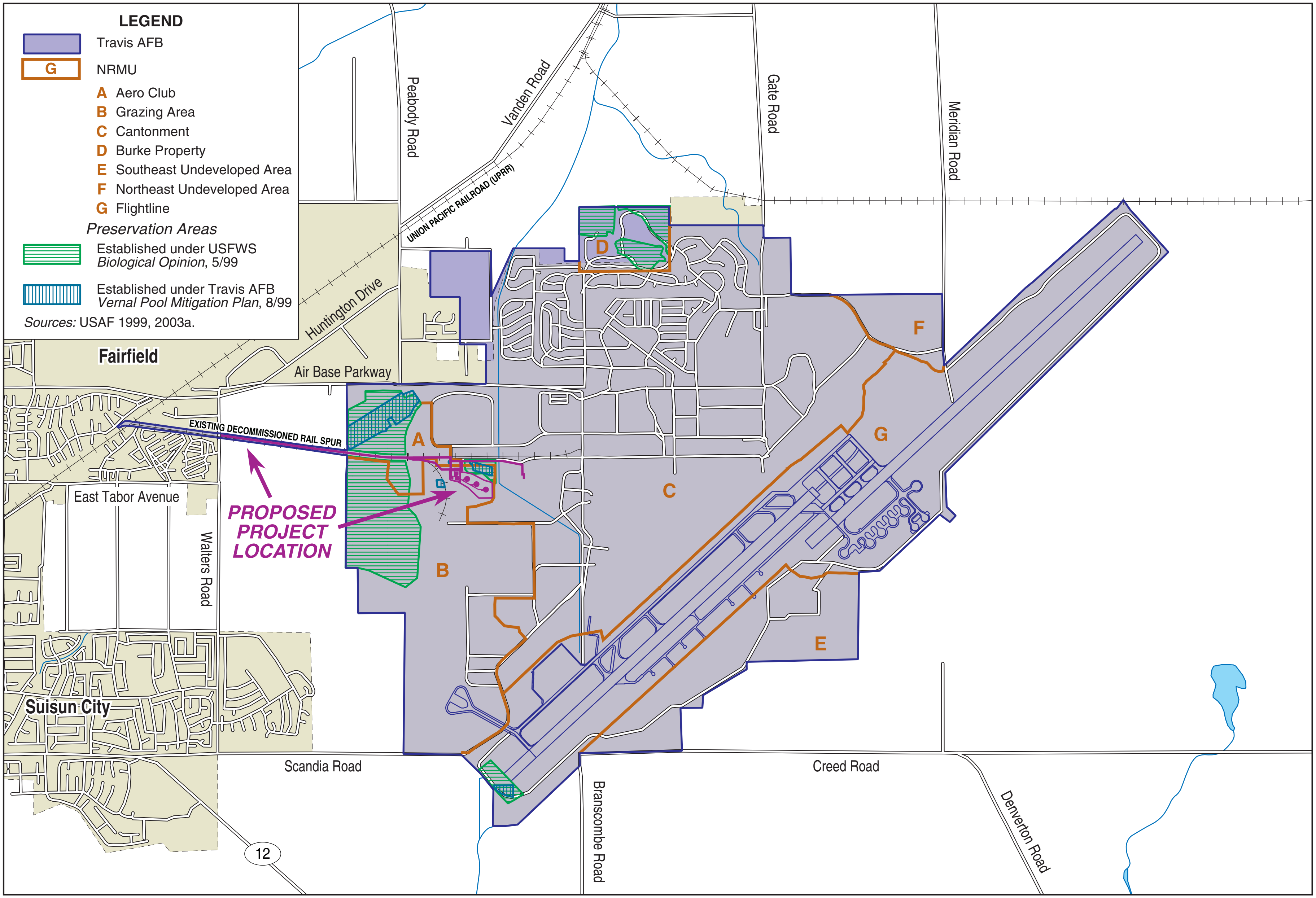
The base's INRMP provides management strategies for each NRMU to integrate natural resource conservation with base activities (USAF 2003a).

Travis AFB's INRMP depicts the location of five on-base ecological preserve areas. Three of these preserves were established as the result of a USFWS *Biological Opinion* dated 28 May 1999 (USAF 2003a), and two preserves are located in the vicinity of the APE, as defined below in Section 3.6.2.3 below. The 1999 *Vernal Pool and Endangered Species Mitigation Plan* depicts the location of five preserve areas established to protect the special-status vernal pool species Contra Costa goldfields (USAF 1999); four of these preserve areas are located in the vicinity of the APE (Figure 3-6).

3.6.2.3 Area of Potential Effect (APE)

The APE encompasses approximately 38.29 acres in the western part of Travis AFB (Figures 3-7 and 3-8) and is the same extent as the APE previously described in Section 3.5, *Water Resources*.

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



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Natural Resource Management Units (NRMUs) and Preservation Areas at Travis Air Force Base

FIGURE 3-6

Vegetation

The proposed Travis Terminal footprint would be partially located within an area previously used to stockpile construction debris, including asphalt and concrete. Constituents from these materials—metals and semi-volatile organic compounds (SVOCs)—have been found in site soils at elevated levels (USAF 1997). Land use and access restrictions have been instituted at the site to prevent unauthorized entry or soil disturbance, as well as development of non-industrial uses on the site (refer to Section 3.12.2.2, *Environmental Restoration Program*) (USAF 2002). The site is currently being used as a heavy equipment training area and is heavily disturbed (USAF 2009f). Vegetation is dominated by early successional/ruderal areas, such as non-native grasses, coyote brush, and yellow star thistle. A small grove of blue gum eucalyptus is located at the eastern edge of the proposed terminal footprint.

An area of relatively undisturbed vernal pools is located north of the proposed terminal footprint, outside of the APE. This vernal pool complex is separated from the heavy equipment training area by a concrete berm to avoid addition of sedimentation into the vernal pools. The channelized west branch of Union Creek runs to the east of the proposed terminal footprint; areas adjacent to the Creek are dominated by freshwater wetland vegetation (USAF 2008f).

Vegetative habitats in the vicinity of the proposed Travis Pipeline footprint consist primarily of annual grassland dominated by non-native grasses in upland areas, and vernal pools and swales adjacent to and associated with ditches running along both sides of the rail spur (USAF 2008f). Reconnaissance of the pipeline footprint on 24 April and 19 June 2008 identified a total of 22 plant species in the vernal pools and swales located along the rail spur (Table 3-15) (USAF 2008g), including the special-status species Contra Costa goldfields (refer to *Special-Status Species* below).

Table 3-15 Plant Species Observed in Vernal Pools in the Vicinity of the Area of Potential Effect (APE)

Common Name	Scientific Name
Bindweed	*Convolvulus arvensis*
Pygmyweed	*Crassula aquatica*
Boggs lake dodder	*Cuscuta howellii*
Annual hairgrass	*Deschampsia danthonioides*
Folded downingia	*Downingia ornatissima*
Spikerush	*Eleocharis macrostachys*
Coyote thistle	*Eryngium vaseyi*
Cranesbill	*Geranium mollis*
Barley	*Hordeum murinum*
Smooth cat's ear	*Hypochaeris glabra*
Toad rush	*Juncus bufonius*

Common Name	Scientific Name
Rayless goldfields	*Lasthenia glaberrima*
Contra Costa goldfields[1]	***Lasthenia conjugens***
Perennial pepperweed	*Lepidium latifolium*
Flowering quillwort	*Lilaea scilloides*
Italian ryegrass	*Lolium multiflorum*
Loosestrife	*Lythrum hyssopifolium*
Popcorn flower	*Plagiobothrys stipitatus*
Dwarf woolly heads	*Psilocarphus brevissimus*
Buttercup	*Ranunculus pusillus*
Buttercup	*Ranunculus bonariensis*
Purslane speedwell	*Veronica peregrina*

[1] Contra Costa goldfields are listed as an *endangered* species under the ESA.
Source: USAF 2008g.

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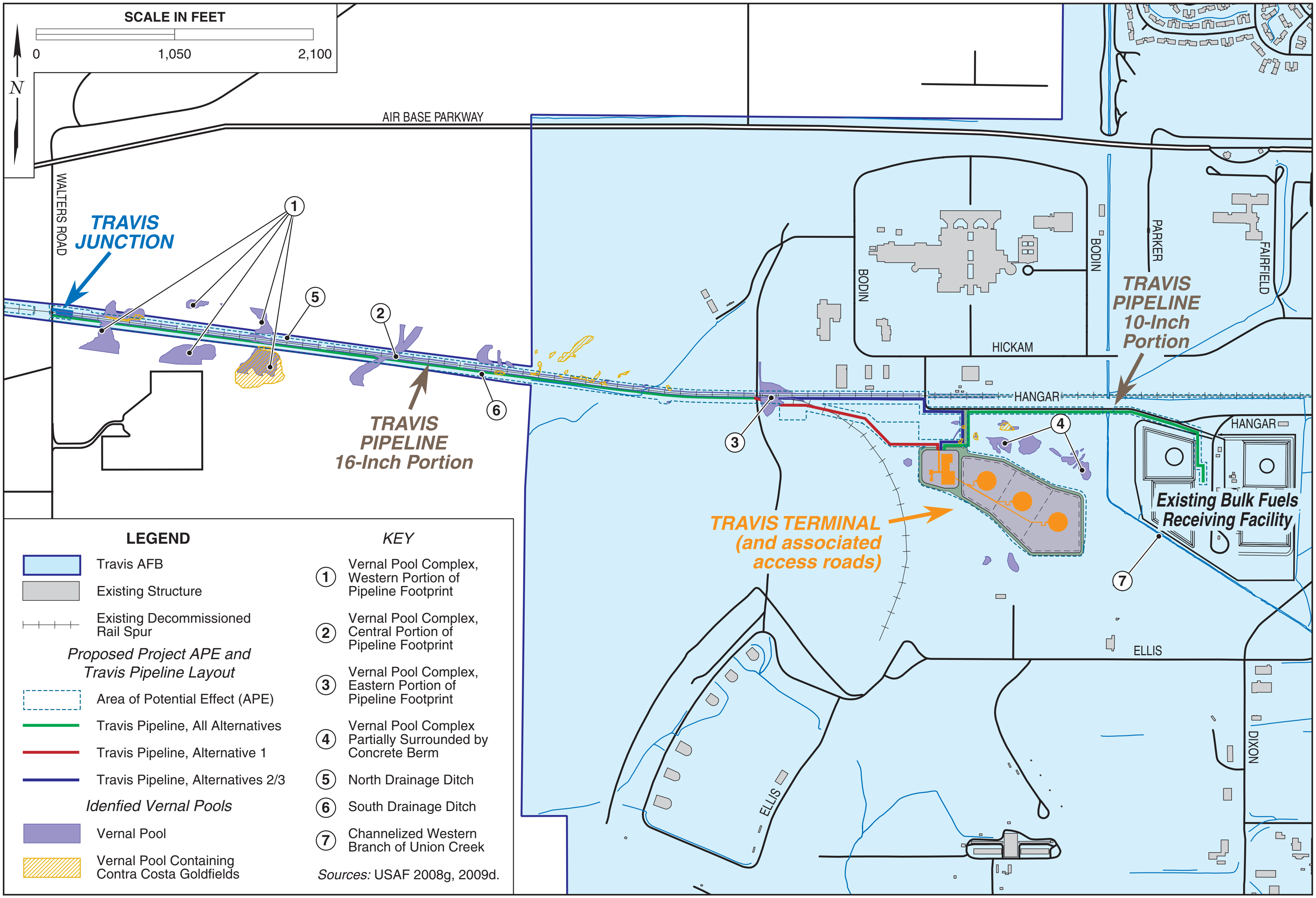

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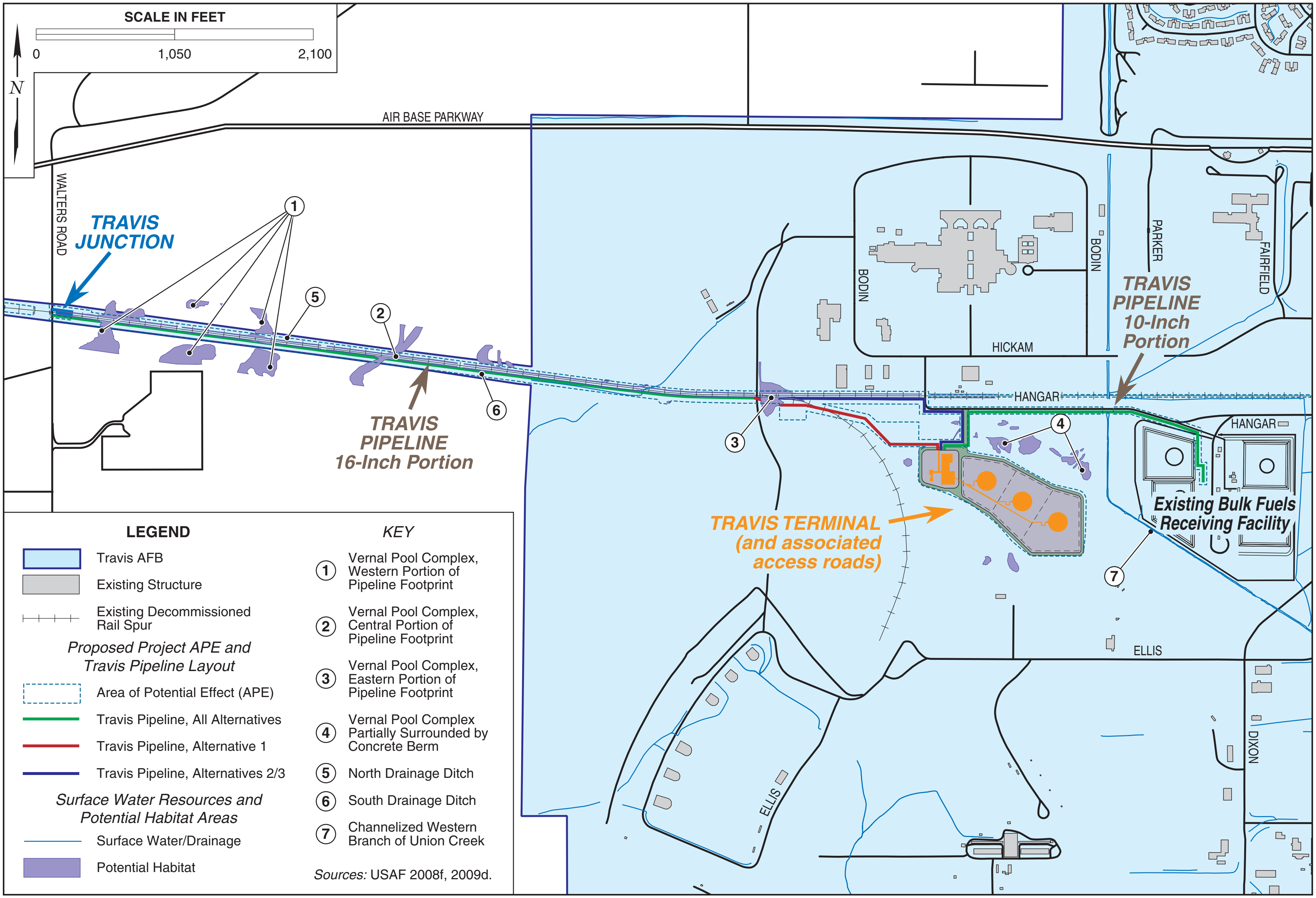
Location of Vernal Pools Containing Contra Costa Goldfields in the Vicinity of the Proposed Project Area of Potential Effect (APE)

FIGURE 3-7



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Potential Habitat Suitable for Sensitive Vernal Pool Invertebrates in the Vicinity of the Proposed Project Area of Potential Effect (APE)

FIGURE 3-8

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

Wildlife

Wildlife in the vicinity of the APE generally consists of species supported by wetland meadows and early successional/ruderal areas, including the deer mouse, gopher snake, house mouse, and northwestern fence lizard (USAF 2003a). Vernal pools and swales in the APE provide a breeding habitat for a number of amphibian and invertebrate species, including the Pacific tree frog (*Hyla regilla*). Vernal pools and swales in the vicinity of the APE also have historic records of the special-status invertebrate species vernal pool fairy shrimp (USAF 2008g), as discussed in *Special-Status Species* below.

Special-Status Species

Vernal pools and swales in the vicinity of the APE may potentially contain suitable habitat for a number of special-status plant and animal species. Habitat assessments (USAF 2008f, 2009g) were conducted in 2008 and 2009 to evaluate potentially suitable habitat in the APE for special-status species, including the California tiger salamander, Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp. Rare plant surveys (USAF 2008g) were also conducted in 2008 to evaluate potentially suitable habitat and, if present, document specific locations of special-status plant species in the APE. Species were chosen based upon their habitat suitability in the APE, as well as likelihood of occurrence, as determined by past observations of the species either at or in the general vicinity of Travis AFB. Detailed site assessment information is summarized below.

Contra Costa goldfields were observed in the vicinity of the APE during two rare plant surveys conducted on 24 April and 19 June 2008. Of the 22 total vernal pools surveyed, 21 were observed as containing Contra Costa goldfields. Population size ranged from two plants in one small pool to an estimated 35,000 in another large pool. The range of Contra Costa goldfields is limited to ten counties in Northern California, and the species is listed as *endangered* under the ESA (USAF 2008g). Refer to Figure 3-7 for the locations of vernal pools containing Contra Costa goldfields in the vicinity of the APE.

Potentially suitable habitat for sensitive vernal pool invertebrates—including **vernal pool fairy shrimp**, **Conservancy fairy shrimp**, and **vernal pool tadpole shrimp**—was assessed via a survey of the APE conducted on 18 March 2008. The survey identified a number of aquatic features throughout the APE that could potentially provide suitable habitat for vernal pool invertebrates, including vernal pools, vernal swales, and ditches (USAF 2008f). Sensitive vernal pool invertebrates have not been historically detected in the APE, and only the vernal pool fairy shrimp has been detected in the vicinity of the APE. However, higher quality vernal pool habitat in and around the APE has the potential to be occupied by sensitive vernal pool invertebrates (USAF 2008f). Under the ESA, the vernal pool fairy shrimp is listed as *threatened*, while Conservancy fairy shrimp and vernal pool tadpole shrimp are listed as *endangered*. Refer to Figure 3-8 for the locations of potentially suitable habitat for these species.

Critical habitat for sensitive vernal pool invertebrates and the special-status plant species Contra Costa goldfields occurs between the western edge of Travis AFB and Walters Road. The APE is excluded from this critical habitat area because it lies within Travis AFB property and is covered by the base *INRMP*. There is also a large on-base vernal pool preserve located north of the APE (USAF 2009a).

CNDDB records indicate two historic occurrences of vernal pool fairy shrimp within approximately 800 feet of the APE. No additional occurrences of sensitive vernal pool invertebrates have been documented on Travis AFB (refer to Figure 3-5) (CNDDB 2008). Occurrences of sensitive vernal pool invertebrates in the vicinity of the APE are summarized in Table 3-16. Potentially suitable breeding habitat for the California tiger salamander was assessed during a 12 May 2009 habitat assessment. The assessment determined that seasonally inundated vernal pool habitat in the APE, as identified through aerial imagery, did not provide the sustained hydroperiods required by this species for breeding (USAF 2009g). The California tiger salamander relies on vernal pools and other intermittent water bodies for completion of its early life stages, and it is listed as *threatened* under the ESA. Potentially suitable upland aestivation habitat for the California tiger salamander was assessed during a July 2009 survey of the APE. The survey did not detect the presence of fossorial mammal burrows in the APE and accordingly determined that aestivation habitat required by the species is likely absent from the APE (USAF 2009g). The California tiger salamander returns to aestivation habitat after spawning in vernal pools and resides in small mammal burrows.

Table 3-16 California Natural Diversity Database (CNDDB) Records of Sensitive Vernal Pool Invertebrates Occurring within 3 Miles of the Area of Potential Effect (APE)

CNDDB No.	Distance to APE (mi)	Locality Information
Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)		
EO 64376	0.15	Travis AFB, immediately N of Ellis Drive
EO 43444	0.15	Travis AFB, NE corner, in *critical habitat preserve area*
EO 48443	0.6	Tolenas (1.0 mi W of Travis AFB)
EO 31380	1.75	Potrero Hills Landfill (1.0 mi SW of Travis AFB)
EO 42570	1.75	Travis AFB, N edge, near residential areas
EO 64375	2.75	Travis AFB, NE portion, adjacent to Runway 3R/21L
EO 64398	3	0.5 mi N of Travis AFB, intersection of Meridian Road/railroad tracks
Conservancy Fairy Shrimp (*Branchinecta conservatio*)		
EO 42090	1.75	Potrero Hills Landfill (1.0 mi SW of Travis AFB)
EO 61695	2	1.0 mi E of Travis AFB
Vernal Pool Tadpole Shrimp (*Branchinecta packardi*)		
EO 31379	1.75	Potrero Hills Landfill (1.0 mi SW of Travis AFB)
EO 61705	2	1.0 mi E of Travis AFB
EO 30600	2.75	SE of SR-12/Scally Road intersection (1.0 mi S of Travis AFB)
EO 64399	3	0.5 mi N of Travis AFB, intersection of Meridian Road/railroad tracks

Source: CNDDB 2008.

CNDDB records indicate five occurrences of the California tiger salamander within 3 miles of the APE, including one observation on the northern edge of Travis AFB (refer to Figure 3-5) (CNDDB 2008). Occurrences of the California tiger salamander in the vicinity of the APE are noted in Table 3-17.

Table 3-17 California Natural Diversity Database (CNDDB) Records of California Tiger Salamander Occurrences within 3 Miles of the Area of Potential Effect (APE)

CNDDB No.	Distance to APE (mi)	Locality Information	Observation Information	Date Observed
EO 64229	1.25	Travis AFB, N edge	1 dead adult observed	10 Feb 1999
EO 66736	1.25	500 ft N of Travis AFB (near Vanden High School)	3 larvae captured	22 Mar 2006
EO 60741	2	1.0 mi N of Travis AFB (man-made pond)	2 larvae observed	8 Mar 2005
EO 64549	2.75	0.5 mi N of Travis AFB (near Meridian Road)	1 larva observed	13 Mar 2006
EO 68397	3	0.5 mi N of Travis AFB (near Meridian Road)	1 adult observed (presumed to be in transit)	29 Nov 2004

Source: CNDDB 2008.

3.7 SOCIOECONOMIC RESOURCES

3.7.1 Definition of Resource

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Human population is affected by regional birth, death, and migration rates. Economic activity typically includes employment, personal income, and industrial growth. Impacts on these two fundamental socioeconomic indicators can also influence other components such as housing availability and provision of public services. Socioeconomic data shown in this section are presented at the county, state, and national level to analyze baseline socioeconomic conditions in the context of regional, state, and national trends. Data have been collected from previously published documents issued by Federal, state, and local agencies (e.g., U.S. Census Bureau) and from state and national databases (e.g., U.S. Bureau of Economic Analysis' [BEA] *Regional Economic Information System*).

3.7.2 Existing Conditions

Travis AFB is located within the City of Fairfield in Solano County, California. Suisun City is also located near the base. The affected environment examined with regard to socioeconomics includes Solano County and, where appropriate, the cities of Fairfield and Suisun City.

3.7.2.1 Population

Solano County is one of 58 counties in California, and ranks 46th in total land area. Solano County is California's 20th most populous county, with a 2000 population of

394,542 (1.2 percent of California's total population). Fairfield is the second most populated city in Solano County, with a 2000 population of 96,178, while Suisun City, with a 2000 population of 26,118, ranks fifth. Together, Fairfield and Suisun City comprised approximately 31.0 percent of the County's total population in 2000. In 2000, approximately 95.1 percent of Solano County residents lived within one of the County's seven incorporated cities (U.S. Census Bureau 2000). Table 3-18 summarizes local, state, and national population trends for 1990, 2000, and 2006.

Table 3-18 Population Overview (1990-2006)

Geographical Area	Estimated 2006	Census 2000	Census 1990	Total % Change (1990-2006)
United States	301,621,157	281,421,906	248,709,873	**21.3%**
California	36,553,215	33,871,648	29,760,021	**22.8%**
Solano County	408,559	394,542	340,421	**20.0%**
Fairfield	104,897	96,178	77,211	**35.9%**
Suisun City	26,917	26,118	22,686	**18.7%**

Sources: U.S. Census Bureau 1990, 2000, 2006.

3.7.2.2 Employment

Job Growth and Earnings

Employment levels in Solano County have increased robustly over the past 16 years, experiencing a cumulative gain of 38,432 jobs (a 27.9 percent increase) between 1990 and 2006 (Table 3-19). In contrast, the County's *military* sector experienced a net loss of 4,962 jobs (a 39.9 percent decrease) during the same period. Overall job growth in Solano County between 1990 and 2006 was roughly the same as the nation (27.9 percent overall job growth) and greater than the State of California (21.0 percent overall job growth) during the same period (U.S. BEA 1990a, 2000a, 2006a).

Per capita personal income in Solano County in 2006 was $35,074, 11.5 percent lower than per capita personal income for the State of California ($39,626) and 4.5 percent lower than the national average ($36,714) (Table 3-19). 2006 per capita personal income in Solano County increased at a moderate pace (17.4 percent) from the 1990 level (adjusted to 2006 dollars), a slightly slower growth rate than California (18.9 percent) and the nation (22.4 percent) for the same period (U.S. BEA 1990b, 2006b; U.S. BLS 2008a).

Average earnings per job (adjusted to 2006 dollars) increased by a modest 6.3 percent in Solano County between 1990 and 2006, a lower rate than the State of California (19.7 percent) and the nation (15.6 percent) for the same period (Table 3-19). By comparison, average annual earnings for *military* jobs in Solano County (adjusted to 2006 dollars) increased by a staggering 50.6 percent between 1990 and 2006 (U.S. BEA 1990b, 2006b; U.S. BLS 2008a).

Table 3-19 Job Growth and Earnings for Solano County, California, and the United States (1990, 2000, 2006), in 2006 Dollars[1]

Geographical Area	1990	2000	2006	Average Annual Change	Total Change 1990-2006
Solano County					
Total Jobs	137,735	160,396	176,167	1.7%	27.9%
Civilian Jobs	125,290	152,577	168,684	2.2%	34.6%
Military Jobs	12,445	7,819	7,483	-2.5%	-39.9%
Military Jobs/Total Jobs	9.0%	4.9%	4.2%	-3.3%	-53.0%
Average Earnings per Job[1]	$44,200	$41,984	$46,983	0.4%	6.3%
Civilian Earnings per Job[1]	$43,081	$40,849	$45,362	0.3%	5.3%
Military Earnings per Job[1]	$55,462	$64,130	$83,536	3.2%	50.6%
Per Capita Personal Income[1]	$29,887	$32,280	$35,074	1.1%	17.4%
California					
Total Jobs	16,965,207	19,626,033	20,525,491	1.3%	21.0%
Average Earnings per Job[1]	$45,821	$52,111	$54,828	1.2%	19.7%
Per Capita Personal Income[1]	$33,323	$37,981	$39,626	1.2%	18.9%
United States					
Total Jobs[2]	139,380.9	166,758.8	178,332.9	1.7%	27.9%
Average Earnings per Job[1]	$40,904	$45,638	$47,286	1.0%	15.6%
Per Capita Personal Income[1]	$29,995	$34,919	$36,714	1.4%	22.4%

[1] Values for 1990 and 2000 are adjusted to 2006 dollars (U.S. Bureau of Labor Statistics [BLS] 2008a).
[2] Total U.S. jobs expressed in thousands.
Sources: U.S. BEA 1990a, 1990b, 2000a, 2000b, 2006a, 2006b; U.S. BLS 2008a.

Work Force and Unemployment

Employment data for Solano County show a large increase in unemployment between March 2008 and March 2009, from 6.2 to 10.9 percent (Table 3-20). However, similar increases were experienced in Fairfield, Suisun City, California, and the U.S. during the same period (U.S. BLS 2008b, 2008c, 2009a, 2009b).

Table 3-20 Work Force and Unemployment (March 2008 and March 2009)

Employment Characteristics	Geographical Area				
	United States[1]	California[1]	Solano County[2]	Fairfield[2]	Suisun City[2]
March 2009					
Work Force	154,048.0[3]	18,614,914	216,634	49,924	15,104
Unemployed	13,161.0[3]	2,091,830	23,668	5,965	1,701
Unemployment Rate	8.5%	11.2%	10.9%	11.9%	11.3%
March 2008					
Work Force	153,843.0[3]	18,269,099	211,686	48,544	14,735
Unemployed	7,820.0[3]	1,166,969	13,208	3,329	949
Unemployment Rate	5.1%	6.4%	6.2%	6.9%	6.4%

[1] seasonally-adjusted.
[2] not seasonally-adjusted.
[3] Total U.S. jobs expressed in thousands.
Sources: U.S. BLS 2008b, 2008c, 2009a, 2009b.

3.7.2.3 Travis Air Force Base

Travis AFB is the largest employer in Solano County (Table 3-21), with a total work force of 14,267, including: 7,304 *active duty*; 3,152 *Air Force/Army Reserve*; 2,247 *appropriated fund personnel (AFP)*; and, 1,564 *non-appropriated fund (NAF)*, *AAFES*, and *contractor/private business personnel* (Solano Economic Development Corporation [EDC] 2007, 2008). Approximately 2,357 employees, or 16.5 percent of total personnel, reside at the base.

Total payroll in fiscal year (FY) 2007 exceeded $685 million (Table 3-21), with $436 million for *active duty*, $78.7 million for *Air Force/Army Reserve*, $131 million for *AFP*, and $39.4 million for *NAF, AAFES,* and *contractor/private business personnel*. Total Travis AFB economic impacts to Solano County are estimated at over $2 billion (USAF 2007d).

Table 3-21 Employment and Payroll at Travis Air Force Base (FY 2007)

Employment Classification	Personnel Level	Payroll Earnings
Active Duty Personnel		
Subtotal	**7,304**	**$436,330,218**
Reserve Personnel		
Subtotal	**3,152**	**$78,691,770**
Civilian: Appropriated Fund Personnel (AFP)[1]		
Subtotal	**2,247**	**$131,307,964**
Civilian: Non-Appropriated Fund (NAF), Contract, and Private Business Personnel		
NAF Personnel	453	$10,739,121
AAFES Personnel	416	$7,969,510
Contract Personnel[2]	642	$19,342,317
Private Business Personnel[3]	53	$1,366,154
Subtotal	**1,564**	**$39,417,102**
TOTAL	**14,267**	**$685,747,054**

[1] includes general schedule/Federal wage board and Veteran's Affairs Outpatient Clinic staff.
[2] includes staff from organizations which provide printing, maintenance, marketing, and other services.
[3] includes staff from Travis Credit Union, Armed Forces Bank, and the U.S. Post Office.
Source: USAF 2007d.

3.8 CULTURAL RESOURCES

3.8.1 Definition of Resource

Cultural resources represent and document activities, accomplishments, and traditions of previous civilizations and link current and former inhabitants of an area. Depending on their conditions and historic use, these resources may provide insight to living conditions in previous civilizations and may retain cultural and religious significance to modern groups.

Archaeological resources comprise areas where prehistoric or historic activity measurably altered the environment or deposits of physical remains (e.g., arrowheads, bottles) discovered therein. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Architectural

resources generally must be more than 50 years old to be considered for inclusion in the NRHP, an inventory of culturally significant resources identified in the U.S.; however, more recent structures, such as Cold War-era resources, may warrant protection if they have the potential to gain significance in the future. Traditional cultural resources can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the persistence of traditional culture.

Cultural resources on Air Force installations are managed in accordance with environmental laws and regulations which include: AFI 32-7065, *Cultural Resources Management*; 32 CFR § 989; EO 11593 of 1971; the NHPA of 1966, as amended; Archaeological and Historic Preservation Act of 1974 (PL 93-291); the Archaeological Resources Protection Act of 1979 (PL 96-95); the AIRFA of 1978 (PL 95-341); the NAGPRA of 1990 (PL 101-601); and, DoD Instruction 4710.02, *DoD Interactions with Federally-Recognized Tribes* (14 September 2006).

The principal Federal law addressing cultural resources is the NHPA of 1966, as amended (16 USC § 470), and its implementing regulations (36 CFR § 800). The regulations, commonly referred to as the Section 106 process, describe the procedures for identifying and evaluating historic properties; assessing the effects of Federal actions on historic properties; and consulting to avoid, reduce, or minimize adverse effects. As part of the Section 106 process, agencies are required to consult with the SHPO.

The term "historic properties" refers to cultural resources that meet specific criteria for eligibility for listing on the NRHP; historic properties need not be formally listed on the NRHP. Section 106 does not require the preservation of historic properties, but ensures that the decisions of Federal agencies concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties. The Proposed Action and project alternatives are an undertaking as defined by 36 CFR § 800.3 and are therefore subject to requirements outlined in Section 106.

The DoD *American Indian and Alaska Native Policy* governs the department's interactions with Federally-recognized tribes. The policy outlines DoD trust obligations, communication procedures with tribes on a government-to-government basis, consultation protocols, and actions to recognize and respect the significance that tribes ascribe to certain natural resources and properties of traditional cultural or religious importance. The policy requires consultation with Federally-recognized tribes for proposed activities that could significantly affect tribal resources or interests.

3.8.2 Existing Conditions

3.8.2.1 Regional History

Archaeological investigations in the California area indicate prehistoric occupation as early as 10,000 to 11,000 years ago. Development of prehistoric cultures in California began circa 2500 B.C. with the emergence of five distinct regional subgroups. The *Central*

California subgroup of peoples resided in a geography which encompasses the present-day San Francisco Bay, Sacramento-San Joaquin Delta, and Sacramento areas. The region featured varied terrain, from bay and delta marine estuaries to valley grasslands to the wooded and chaparral foothills of the Coast Range. Artifacts indicate an existence rich in cultural development with food staples ranging from fish and waterfowl to acorns, elk, and deer. Settlements in modern-day Solano County were heavily influenced by the Delta as a means of food and livelihood (USAF 2003f).

Original occupation of the Central California region was limited to coastal and bay areas, but evolved during the *Early Horizon* period (2500 to 1500 B.C.) as populations dispersed to interior foothills. Migration of Penutian-speaking tribes from inland areas during the *Middle Horizon* period (1500 B.C. to A.D. 500) led to gradual changes in linguistics and culture, as well as population increases. By the *Late Horizon* period (A.D. 500 to 1900), Central California was a socially complex society, full of intensive trade, elaborate ceremonialism, and numerous settlements. The Penutian-speaking Southern Patwin peoples resided in the Delta region, with the Suisun and Tolenas tribes residing in present-day Solano County (USAF 2003f).

Spanish settlement in the mid-eighteenth century laid the foundation for agricultural development in California. Grazing and irrigated cultivation intensified as Mexican rule commenced in the 1830s and the establishment of large privately-owned *ranchos* began. California's transition to U.S. statehood in the 1840s and the subsequent flood of immigrants in the 1850s led to large-scale cattle grazing and grain cultivation. Solano County was established in 1850 and immediately flourished due to its strategic location along the Sacramento-San Francisco Bay corridor. Grazing and cultivation, as well as the eventual rise of specialty crops, all played a pivotal role in establishing the County economy. Opportune linkages to rail and, later, automobile transport networks further enhanced the economy, leading to rapid mining and industrial development at the dawn of the twentieth century (USAF 2003f).

3.8.2.2 History of Travis Air Force Base

Present-day Travis AFB was originally established in 1942 as a temporary bomber base to assist World War II (WWII) efforts in the Pacific. The 945-acre site was activated as *Fairfield-Suisun Army Air Base* in May 1943 and developed into the largest West Coast air terminal by the end of WWII. Establishment of the USAF and construction of a new 10,000-foot runway led to the creation of *Fairfield-Suisun AFB* in 1947; the base was later renamed *Travis* AFB in 1951 to honor Brigadier General Robert F. Travis. Strategic Air Command (SAC) commenced operational control in 1949, and base missions during the next nine years focused on the operation and maintenance of WWII vintage aircraft. Consequently, a number of hangars, maintenance facilities, on-base fuel storage, and a second runway were constructed, as well as barracks and family living quarters. The base also housed an Atomic Energy Commission weapons storage facility from 1955 to 1962, for which approximately 50 buildings were constructed (USAF 2003f).

Command of Travis AFB shifted in 1958 from SAC to the Military Air Transport Service (MATS), and the 1501st Air Transport Wing (ATW) was activated. The 1501st ATW flew a

wide variety of transport aircraft, and base missions focused on rapid cargo and equipment transport. In 1966, MATS was redesignated as the Military Airlift Command (MAC), and 1501st ATW equipment and personnel were organized into the 60th Military Airlift Wing (MAW). The 60th MAW served an essential role in receiving aeromedical transports during combat in Southeast Asia, and Travis AFB would become known as the *Gateway to the Pacific*. Operation of the largest USAF airlift aircraft, the C-5 Galaxy, began in 1970, and the base aided numerous military and humanitarian missions during the next thirty years. Command of the base shifted again in 1992, from MAC to the AMC, and the 60th MAW was redesignated as the 60th AMW (USAF 2003f). Today, the mission of Travis AFB is to provide rapid, responsive, reliable airlift of forces to any worldwide location to fulfill the global logistics needs of the AMC.

3.8.2.3 Area of Potential Effect (APE)

The APE for cultural resources encompasses approximately 38.29 acres in the western part of Travis AFB and is the same extent as the APE previously described in Sections 3.5 and 3.6.

<u>History of the APE</u>

In 1943, establishment of the *Fairfield-Suisun Army Air Base* included construction of an approximately 2.8-mile rail spur to connect an existing off-base Southern Pacific Railroad (SPRR) line to newly-established on-base supply transfer facilities. The rail spur began approximately 0.5 mile west of the APE at the SPRR line, ran the entire length of the proposed Travis Pipeline footprint, and terminated approximately 0.7 mile to the east at on-base supply transfer facilities (USAF 1986, 2009f, 2009h). Use of the rail spur peaked in the 1950s and was largely replaced with tractor trailer cargo shipping by the 1970s. Use was discontinued altogether by 1992, and there are no plans to reinstate shipping or other uses on the spur (USAF 2009f, 2009h). Areas adjacent to the rail spur are currently maintained by mowing, but there are otherwise no active uses along the spur (USAF 2009i). The rail spur was evaluated during a 1995 basewide cultural resources survey and was determined to not be eligible for listing on the NRHP (Headquarters/ Air Mobility Command [HQ AMC] 1995). The California SHPO concurred with these findings in a 29 July 1996 letter (SHPO 1996).

The proposed Travis Terminal footprint would be partially located within an area that was used from the early 1960s to the late 1990s to stockpile construction debris. Constituents from these materials—metals and SVOCs—have been found in site soils at elevated levels (USAF 1997), and land use and access restrictions have been instituted at the site to prevent unauthorized entry, disturbance, or use (refer to Section 3.12.2.2, *Environmental Restoration Program*) (USAF 2002). The site is currently being used as a heavy equipment training area and is heavily disturbed (USAF 2008h).

3.8.2.4 Cultural Resources at Travis AFB

Identification of cultural resources potentially impacted by the Proposed Action or project alternatives was accomplished by reviewing the 2003 Travis AFB *ICRMP* (USAF 2003f) and conducting a records search at the California Historical Resource

Information System *North Coast Information Center* at Sonoma State University in Rohnert Park. Four cultural resources investigations were conducted within the APE (Table 3-22), and two additional investigations were conducted within 0.25 mile of the APE (Table 3-23).

Table 3-22 Cultural Resources Investigations Conducted within the Area of Potential Effect (APE)

Year	Author	Report Title	Findings
1989	HQ AMC	*Cultural Resources Assessment*	Made recommendations for survey efforts needed to complete NHPA Section 110 identification requirements. Provided the basis for designating areas with the potential to contain intact cultural resources.
1995	HQ AMC	*An Archaeological and Historic Resources Study and Inventory of Travis AFB, Solano and Contra Costa Counties, California*	No prehistoric sites identified. Six historical archeological sites identified, none of which are eligible for the NRHP. Inventoried all WWII-era permanent structures, and prepared state inventory forms for those structures. Survey included the decommissioned rail spur located in the APE; determined rail spur is not eligible for NRHP listing.
1996	HQ AMC	*Travis AFB, California: Inventory of Cold War Properties*	Survey selected 51 building for evaluation based on their Cold War role. The report recommended 34 properties as eligible for the NRHP.
2003	USAF	*Travis AFB: Integrated Cultural Resources Management Plan (ICRMP)*	A five-year plan (FY 2003-2008) for the management of cultural resources at Travis AFB.

Sources: HQ AMC 1989, 1995, 1996; USAF 2003f.

Table 3-23 Cultural Resources Investigations Conducted within 0.25 Mile of the Area of Potential Effect (APE)

Year	Author	Report Title	Findings
1984	Flynn & Roop	*Section 106 Survey for a Proposed Medical Facility (100 acres)*	Two prehistoric sites recorded at Travis AFB. Site CA-SOL-313 was NRHP-eligible and was later subjected to data recovery prior to destruction.
1989	Roop et al.	*Data Recovery Mitigation of CA-SOL-313 for a Proposed Medical Facility*	One prehistoric lithic scatter recorded.

Sources: Flynn & Roop 1984; Roop et al. 1989.

Prehistoric Archeological Resources

The 2003 Travis AFB *ICRMP* (USAF 2003f) identified ten archaeological sites on the base. The sites consisted of three prehistoric archaeological sites and seven historical archaeological sites. None of the seven historical archaeological sites are eligible for the NRHP and none require further investigation. Two prehistoric sites within 0.25 mile of the APE were identified during an intensive pedestrian survey where the DGMC now stands: *CA-SOL-313* and *CA-SOL-314* (Table 3-24) (Flynn & Roop 1984).

Site CA-SOL-313, a prehistoric lithic scatter, was located in the western part of Travis AFB. Artifacts recovered included a total of 18 forms of lithic artifacts that were predominantly battered, ground, or chipped stone of non-local origin and lithology. These artifacts included mattocks, picks, hammers, pestles, a hopper mortar, and

various tools. Site CA-SOL 313 was destroyed after data recovery during the construction of the DGMC (Roop et al. 1989).

Site CA-SOL-314, also located in the western part of the base, did not meet NRHP eligibility criteria, and therefore no further work was recommended. Site CA-SOL 314 was destroyed during the construction of the DGMC (Roop et al. 1989).

Table 3-24 Prehistoric Archaeological Resources Located within 0.25 Mile of the Area of Potential Effect (APE)

Site Number	Type of Site	Site Information	NRHP Eligibility
CA-SOL-313	Lithic Site	Unknown occupational period.	Documented in 1984, Site CA-SOL-313 was NRHP eligible. Subjected to data recovery due to proposed construction of the DGMC. Destroyed during construction of the DGMC.
CA-SOL-314	Lithic Site	Unknown occupational period.	Documented in 1984, Site CA-SOL-314 was determined ineligible for the NRHP, and was destroyed during the construction of the DGMC.

Sources: Flynn & Roop 1984; Roop et al. 1989.

Historic Archaeological Resources

Travis AFB contracted with Argonne National Laboratories to conduct a comprehensive survey of Travis AFB in compliance with Section 110 of NHPA (HQ AMC 1995). The field team surveyed all undisturbed portions of Travis AFB. Five historical archeological sites were identified during the survey.

One historic farmstead site, **TAFB-H-02**, is located within the APE near the site of the proposed Travis Tank Farm (Table 3-25). Another historic homestead site, **TAFB-H-03**, is located within 0.25 mile of the APE (Table 3-26). Data recovered from these two identified historic sites indicated that neither site met NRHP evaluation criteria for eligibility. No further work is recommended at these locations (HQ AMC 1995).

Table 3-25 Historic Archaeological Resources Located within the Area of Potential Effect (APE)

Site Number	Type of Site	Site Information	NRHP Eligibility
TAFB-H-02	Historic Farmstead	Early 19th century farmstead. Documented in 1995 during a NHPA Section 110 basewide cultural resources inventory. Survey included a total of 957 acres.	Ineligible

Source: HQ AMC 1995.

Table 3-26 Historic Archaeological Resources Located within 0.25 Mile of the Area of Potential Effect (APE)

Site Number	Type of Site	Site Information	NRHP Eligibility
TAFB-H-03	Historic Farmstead	Early 19th century farmstead. Documented in 1995 during a NHPA Section 110 basewide cultural resources inventory. Survey included a total of 957 acres.	Ineligible

Source: HQ AMC 1995.

Historic Buildings and Structures

In 1994, HQ AMC began a reconnaissance inventory of Cold War resources and related material culture at eight selected Air Force Bases throughout the U.S. The overall goal of the study was to comply with Section 110 of the NHPA and to provide cultural resources managers with a tool for determining the NRHP eligibility of Cold War-era properties. Travis AFB was included in the survey and the results are presented in *Travis AFB, California: Inventory of Cold War Properties* (HQ AMC 1996).

The study selected 71 structures at Travis AFB for inventory based on the base's Cold War mission. Of these, 32 structures were evaluated as potentially eligible for the NRHP under *Criterion C* and *Criteria Consideration G*. Building (Bldg.) 810, a double cantilever B-36 Bomber hangar located within 0.25 mile of the APE, was identified as one of the potentially eligible Cold War-era facilities. The B-36, the first intercontinental bomber with a 10,000-mile traveling range, was housed in Bldg. 810 beginning in 1952. Bldg. 810 is one of the first double cantilever medium bomber hangars built in the U.S. and displays few exterior modifications. This building retains integrity and has been recommended as eligible for inclusion on the NRHP (HQ AMC 1996; USAF 2003f) (Table 3-27).

Table 3-27 Cultural Resources Located within 0.25 Mile of the Area of Potential Effect (APE)

Site Number	Type of Site	Site Information	NRHP Eligibility
Bldg. 810	Cold War-era Hangar	Double-cantilever, B-36 Bomber hangar constructed in 1952 by Kuljian Corporation.	Eligible

Sources: HQ AMC 1996; USAF 2003f.

Native American Interests

Native American resources can include, but are not limited to, archaeological sites, burial sites, ceremonial areas, caves, mountains, water sources, trails, plant habitat or gathering areas, or any other natural area important to a culture for religious or heritage reasons. NRHP-eligible traditional sites are subject to the same regulations, and afforded the same protection, as other types of historic properties. The APE, as defined in Section 3.8.2.3 above, also applies as the APE for Native American resources.

Early and effective participation of Native American tribes and groups is an integral component to the successful completion of the Section 106 process. As part of the preparation of the Travis AFB *ICRMP*, the USAF contacted Native American groups in July 2002 to request background information regarding prehistoric, historic, and ethnographic land use, as well as information regarding contemporary Native American values or concerns on Travis AFB property. No responses were received, and there is no evidence that any Native American burial grounds or sacred areas are located on-base that would be subject to the provisions of AIRFA or NAGPRA (USAF 2003f).

State Historic Preservation Office (SHPO) Consultation

On 28 August 2009, the USAF submitted a *Determination and Request for Concurrence* for a finding of "No Historic Properties Affected" (36 CFR § 800.4[d][2]) to the California SHPO. Refer to *Appendix E* for the concurrence letter and associated figure submitted to the SHPO.

On 29 October 2009, the California SHPO submitted a letter to the USAF stating that it *concurred* with USAF's finding of "No Historic Properties Affected" (SHPO 2009) (refer to Section 4.8, *Cultural Resources*, and *Appendix E* for additional information).

3.9 LAND USE

3.9.1 Definition of Resource

Land use comprises natural conditions or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, agricultural, institutional, recreational, communications, utilities, and other developed uses. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect environmentally sensitive or other specially designated areas.

The USAF has established siting criteria in AFI 32-1026, *Planning and Design of Airfields*, and Air Force Manual (AFM) 32-1013, *Airfield and Heliport Planning Criteria,* for land development at USAF installations, including safety zones relative to runways and munitions storage. Additional criteria in UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, establish setbacks and other security measures to protect DoD facilities from potentially non-secure adjacent uses (e.g., parking lots, off-base areas, etc.). Criteria in UFC 3-460-01, *Petroleum Fuel Facilities*, are specific to DoD petroleum fuel facilities, and establish design and location standards to ensure compatibility with adjacent land uses.

3.9.2 Existing Conditions

3.9.2.1 Regional Land Use

Travis AFB is located in central Solano County, near the Sacramento-San Joaquin Delta Region of Northern California. To the east of the County is the flat agriculturally-productive Central Valley Region and California's capitol, the City of Sacramento. Coast Range foothills lie to the north and west of the County, and the San Francisco Bay Area Metropolitan Area and City of San Francisco are located to the southwest. Solano County's topography is varied, with inland river delta and estuary areas in the southern portion, foothills in the northern and western portions, and flat agricultural and open space areas in the central and eastern portions of the County (Solano County 2006c).

Agricultural activities are the predominant land use in Solano County, with over 56 percent of County land in use as rangeland or cropland. Water, watershed, and marsh areas comprise over 26 percent of County land use. Residential, commercial, and industrial uses are primarily concentrated in the incorporated cities of Fairfield, Vacaville, Vallejo, Benicia, Dixon, Rio Vista, and Suisun City. The vast majority of County population growth between 1990 and 2005 took place within these incorporated cities (Solano County 2006c, 2006d).

3.9.2.2 Local Land Use

Travis AFB is comprised of approximately 6,383 acres of land located mostly within the City of Fairfield, approximately 5 miles west of the City's central business district (USAF 2003a). Suisun City is located approximately 0.5 mile southwest of the base. Fairfield and Suisun City are the population centers closest to the base. Land use west of the base is comprised of low- and medium-density housing, parks, and intermittent commercial uses (Fairfield 2007a; Suisun City 1992). Areas to the north, east, and south of the base are part of the 7,890-acre *Travis Reserve Area*, an open space and agricultural preserve established by the City of Fairfield in 2002 to prevent development from encroaching onto Travis AFB (USAF 2006a). Land use objectives, policies, and regulations in the vicinity of Travis AFB are outlined in the Solano County, Suisun City, and Fairfield *General Plans* (Fairfield 2003; Solano County 2006e; Suisun City 1992).

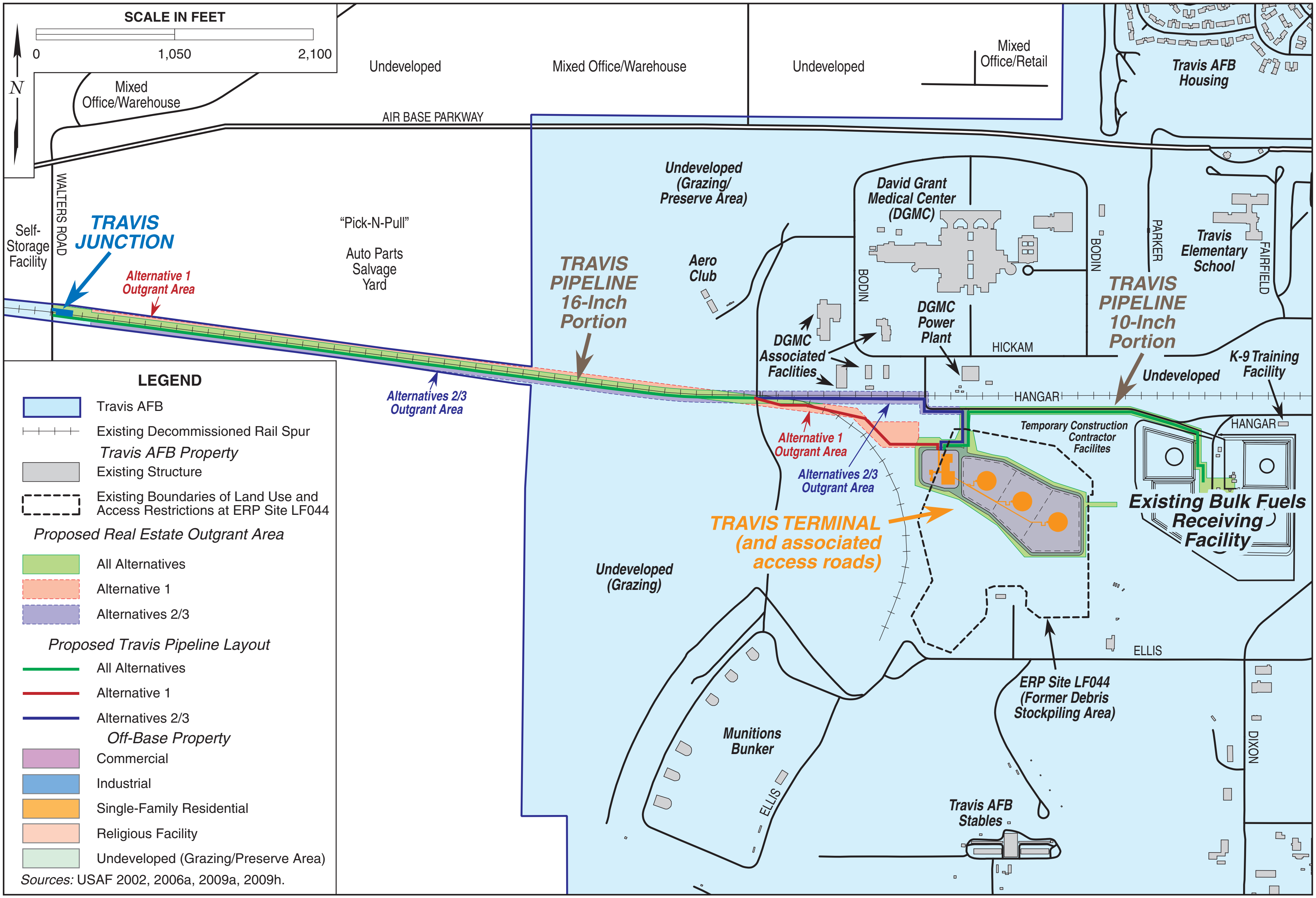
3.9.2.3 Travis Air Force Base

Historical and proposed land use development at Travis AFB is presented in the base's *General Plan*, most recently updated in 2006. This plan establishes goals, policies, and criteria that drive decisions regarding timing, placement, and priority of identified development needs. An overarching goal of the plan is to outline expansion and redevelopment opportunities to accommodate future mission growth and/or reorganization (USAF 2006a).

Travis AFB is comprised of approximately 6,383 acres of land divided by the USAF into eight classifications. There are approximately 1,725 buildings on-base, totaling roughly 10,207,406 square feet. Aircraft and vehicle maintenance and storage facilities are located adjacent to the runways and aircraft parking ramps. Community and administration facilities are situated at the center of the base. Residential uses include 1,107 family housing units, 17 dormitories, and 17 temporary quarters located in the northern part of the base. Open space and preservation areas are concentrated in the western and southern parts of the base (USAF 2006a).

<u>Composite Outgrant Area</u>

The *composite outgrant area* would be located adjacent to on-base and off-base property. Adjacent on-base property is generally comprised of a combination of open space and industrial land use, while adjacent off-base property generally consists of open space (USAF 2006a, 2009i), as shown on Figure 3-9 and summarized in Table 3-28.



EA

Existing Land Use in the Vicinity of the Proposed Travis Air Force Base Real Estate Outgrant Area

FIGURE 3-9

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

Table 3-28 Land Use in the Vicinity of the Proposed Travis Air Force Base Composite Outgrant Area

Direction	Property Use	Description
Travis Air Force Base Property		
North	Aero Club	Landing strip used for DGMC aircraft; located 0.25 mi north of the outgrant area.
	Undeveloped Property with Vernal Pool Preserve Area	Located south of the Aero Club and west of DGMC; one of five on-base preserve areas.
	DGMC-Associated Facilities	DGMC power plant, waste transfer, and supply storage facilities. DGMC is located 0.25 mi north of the outgrant area.
	Undeveloped	Area north of Hangar Avenue; includes the channelized west branch of Union Creek.
East	Undeveloped	Area north of Hangar Avenue.
	Decommissioned Rail Spur: Eastern Continuation	Decommissioned rail spur continues to the east for approximately 0.7 mi.
	K-9 Dog Training Facility	Temporary dog training facility.
South	Bulk Fuels Receiving Facility	Primary Travis AFB fuel receiving facility. Capacity exceeds 14 million gal.
	Temporary Construction Contractor Facilities	Temporary offices, parking, and storage associated with a construction contractor.
	ERP Site LF044 (former debris stockpiling area)	Former construction debris stockpiling area. Access and use is restricted (refer to Section 3.12.2.2, *Environmental Restoration Program*). Occasionally used for heavy equipment training. Partially within the outgrant area.
	Decommissioned Rail Spur: Southward Rail Spur	Southward spur formerly used to transport munitions to/from the Munitions Bunker.
	Munitions Bunker and Associated Access Road	Munitions storage facility, located 0.25 mi south of the outgrant area; associated north-south access road crosses the outgrant area.
	Undeveloped Property	Used for grazing.
West	Decommissioned Rail Spur: Western Continuation	Decommissioned rail spur continues to the west for approximately 0.5 mi.
Off-Base Property		
North	Undeveloped Property	Used for grazing.
	Pick-N-Pull	Commercial auto parts salvage yard.
West	Residential and Commercial Development	Older residential development and commercial storage facilities, located west of Walters Road in the City of Fairfield.
South	Residential and Institutional Development	New residential development and large religious facility, located 0.25 mi south of the outgrant area in Suisun City.
	Undeveloped Property	Used for grazing.

Sources: USAF 2002, 2006a, 2008h, 2009i.

3.10 TRANSPORTATION SYSTEMS

3.10.1 Definition of Resource

Transportation systems facilitate the movement of vehicles and transportation of goods and materials through a network of roads and highways. Primary roads are principal arterials, such as major highways, designed to move traffic but not necessarily provide access to adjacent areas. Secondary roads are arterials such as rural highways and major surface streets that provide access to residential and commercial areas, hospitals, and schools.

3.10.2 Existing Conditions

3.10.2.1 Regional Transportation Systems

Travis AFB is located in the City of Fairfield, Solano County, California. Fairfield is served by I-80, located approximately 5 miles west of the base, a major regional highway which connects Fairfield with San Francisco (located 45 miles to the southwest) and California's capitol, the City of Sacramento (located 35 miles to the northeast). I-680, traveling about 10 miles southwest of the base, provides a link to the southern and eastern portions of the San Francisco Bay Metropolitan Area. I-505, located about 10 miles northwest of the base near the City of Vacaville, provides a regional connection to I-5, a major north-south highway which serves the entire West Coast. California State Route (SR-) 12 also serves Fairfield; the highway runs to the south of Fairfield and Travis AFB, and provides a link to California's Central Valley Region (USAF 2003a).

Mass transit in the region is provided by airline, rail, and motor transportation systems. International airports serving the cities of Oakland, Sacramento, and San Francisco are located within 50 miles of the base. The Nut Tree and Rio Vista Municipal Airports are both located within 15 miles of the base. Amtrak's *Capitol Corridor* provides daily passenger rail service to Solano County via the Suisun/ Fairfield Train Station, located approximately 5 miles southwest of the base. Passenger bus service in Solano County is available through city and regional transit systems which provide links to transit systems in several nearby counties (Solano County 2006f).

3.10.2.2 Local Transportation Systems

Local access to Travis AFB is provided by a number of roadways. Primary access to the base is via Air Base Parkway, a four-lane divided expressway which begins at I-80 and runs east approximately 5 miles to the Main Entrance Gate. Multiple regional roadways connect to Air Base Parkway at various locations, including Peabody Road and Vanden Road, both of which begin in Vacaville and connect to Air Base Parkway near the Main Entrance Gate, and Walters Road, which begins at SR-12 east of Suisun City and connects to Air Base Parkway approximately 2 miles west of the Main Entrance Gate (USAF 2003a). Passenger bus service to the base is available via Fairfield Transit *Route 2*; the route serves publicly-accessible on-base areas such as the DGMC (Fairfield 2007b).

The local transportation network near Travis AFB and estimated annual average daily traffic (ADT) volumes and peak hour level of service (LOS) ratings[2] are presented on Figure 3-10. Air Base Parkway, the base's primary access routes, contains a LOS of "F" for westbound and eastbound traffic, with ADT volumes in both directions totaling approximately 18,000 vehicles near Walters Road. Westbound and eastbound ADT volumes on I-80 in the vicinity of the Air Base Parkway interchange are 161,000 and 97,000, respectively, with a LOS of "F" for both directions. SR-12, the closest State highway facility to Travis AFB, contains a LOS of "D" (westbound) and "A-C" (eastbound). For northbound and southbound traffic, Peabody Road and Vanden Road respectively contain LOSs of "E" and "A-C" near the base (Solano County 2008).

3.10.2.3 Travis Air Force Base

Primary access to Travis AFB is through the 24-hour operational Main Entrance Gate, located at the terminus of Air Base Parkway. Visitors to the base, including temporary and contract personnel, typically enter through this gate. The nearby DGMC Gate provides access for DGMC employees, patients, and visitors, and the North and South Gates respectively provide additional access along the northern and southern perimeters of the base (USAF 2006a). All deliveries of commercial goods and construction materials occur through the South Gate during daily operational hours of 6:00 AM to 6:00 PM (USAF 2009j).

Travis Avenue, which begins at the Main Entrance Gate at the terminus of Air Base Parkway, provides primary east-west circulation on the base. Hickman and Hangar Avenues, both located to the south of Travis Avenue, provide additional east-west circulation. North-south circulation is primarily provided by Burgan Boulevard and Ragsdale Street, which respectively provide access to the North and South Gates. Parker Road provides access to the DGMC via the DGMC Gate. Cannon Drive provides primary access and circulation to residential areas in the northern part of the base. Numerous auxiliary streets and roadways provide additional circulation throughout the base (USAF 2003a).

<u>Composite Outgrant Area</u>

The eastern part of the *composite outgrant area* is accessible via Hangar Avenue, and the proposed Travis Terminal footprint is accessible via an unimproved road connected to Hangar Avenue. A majority of the proposed Travis Pipeline footprint does not contain established roadway access; however, the footprint is accessible via the existing decommissioned rail spur (USAF 2009j). The westernmost perimeter of the outgrant area is accessible off base via Walters Road or on-base via the decommissioned rail spur (USAF 2003a).

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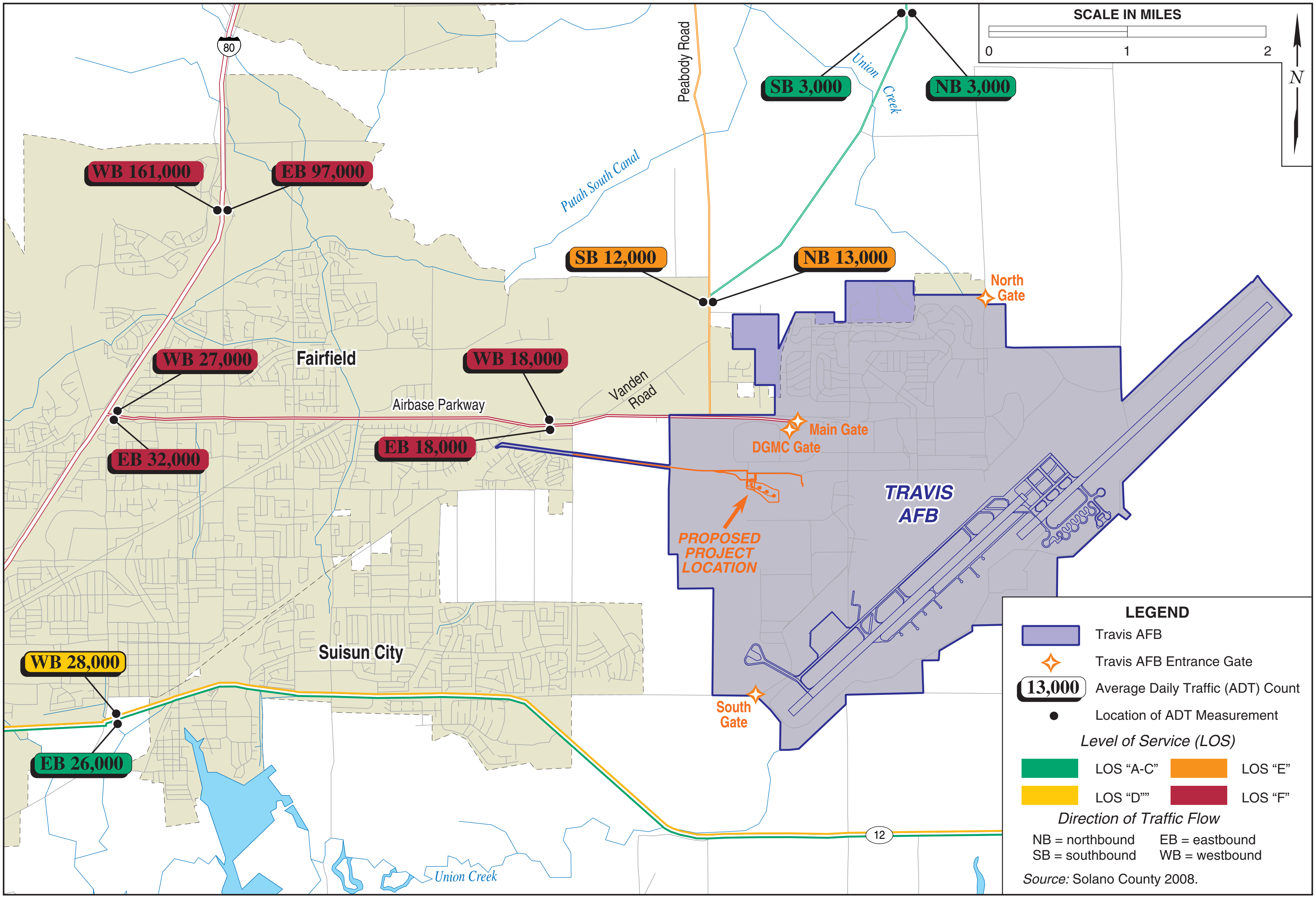
[2] *LOS ratings* are a relative measure of traffic congestion, with "A-C" denoting free to stable traffic flow, "D" denoting high-density but stable flow, "E" denoting near-capacity operating conditions, and "F" denoting unstable ("stop-and-go") operating conditions. LOS ratings are typically measured during peak operational hours (e.g., weekdays 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM) (Solano County 2008).

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



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Local Transportation Network, Average Daily Traffic (ADT) Counts, and Peak Hour Level of Service (LOS) Ratings in the Vicinity of Travis Air Force Base

FIGURE 3-10

3.11 SAFETY AND OCCUPATIONAL HEALTH

3.11.1 Definition of Resource

The primary safety issues affecting DoD petroleum fuel facilities are security, the prevention of spills, and fire protection. UFC 3-460-01, *Petroleum Fuel Facilities*, outlines specific criteria for the siting, design, construction materials, operations, monitoring, and protection of DoD petroleum fuel facilities. Additionally, UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, outlines various planning, construction, and operational standards to address potential terrorism threats. These Anti-Terrorism/Force Protection (AT/FP) standards focus on the establishment of setbacks and other security measures to protect DoD facilities from potentially non-secure adjacent uses (e.g., parking lots, off-base areas, etc.). All DoD petroleum fuel facilities must comply with AT/FP standards; however, mission-critical fuel facilities are recommended to be designed to significantly higher levels of protection than those under basic AT/FP standards.

AFM 91-201, *Explosives Safety Standards*, requires that defined quantity distance (QD) arcs be maintained between explosive materials storage (e.g., munitions) and handling facilities and various other uses, including petroleum fuel facilities. QD arcs are determined by the type and quantity of explosive materials stored; within QD arcs, development is either restricted or altogether prohibited in order to maintain personnel safety and minimize the potential for damage in the event of an accident. All petroleum fuel facilities must be located outside of QD arcs.

Additional site-specific safety and occupational health standards may also apply to DoD petroleum fuel facilities based on facility location and type, or historical site environmental conditions. These standards may be implemented through site-specific management plans, use restrictions, or other measures.

3.11.2 Existing Conditions

3.11.2.1 Petroleum Fuel Facilites Safety

The safety of petroleum fuel facilities safety at Travis AFB is outlined in the base's *ICP for Oil and Hazardous Substance Spill Prevention and Response* (USAF 2008a). The ICP ensures specific procedures for preparing for and responding to inadvertent discharges of petroleum fuel at the base, and includes contingency plans to address unauthorized releases. All existing and proposed petroleum fuel facilities at Travis AFB are subject to the procedures outlined in the ICP. In addition, all on-base fuel facilities must conform to the criteria in UFC 3-460-01, *Petroleum Fuel Facilities*, and, as applicable, those in UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*. Refer to Section 3.4.2.3, *Stored Fuels and Petroleum Products*, for more information on Travis AFB petroleum fuel facilities.

3.11.2.2 Explosives Safety

QD arcs at Travis AFB are associated with multiple munitions storage areas in the southern and western parts of the base. QD arc radii vary from 1,250 to 2,100 feet, depending on the type(s) of explosives stored. The entire *composite outgrant area* would be located outside of on-base QD arcs (USAF 2006a).

3.11.2.3 Other Safety Considerations

The proposed Travis Terminal footprint would be partially located within a former debris stockpiling area with elevated levels of metals and SVOCs in site soils. Access and use restrictions have been instituted at this site to protect safety and occupational health (USAF 2002). Refer to Section 3.12.2.2, *Environmental Restoration Program*, for additional information on this site.

3.12 ENVIRONMENTAL MANAGEMENT

3.12.1 Definition of Resource

Environmental management addresses contamination of soils, groundwater, and other hydrogeologic resources through the implementation of preventative measures to avoid contamination, as well as the administration of investigation and remediation procedures to address existing contamination. The *Pollution Prevention Act* of 1990 was enacted to focus industry, government, and the public on pollution reduction through the use of preventative measures, as opposed to treatment and disposal. AFI 32-7080, *Pollution Prevention Program*, provides guidance for reducing and/or eliminating hazardous substances at installations, and developing and implementing recycling and waste diversion programs. USAF installations often develop *Pollution Prevention Management Action Plans* (P2 MAPs) that incorporate management strategies for implementing recycling and other pollution prevention programs. P2 MAPs also typically address energy conservation, solid and hazardous waste management, and the reduction and/or elimination of industrial toxins.

The DoD *Installation Restoration Program* (IRP) (now the ERP) was established in 1983 to address the cleanup of abandoned or inactive sites where spills or releases of hazardous substances may pose a hazard to human health or the environment. ERP site investigation and remediation procedures are developed in accordance with CERCLA requirements and are documented in *Record of Decision* (ROD) documents which characterize site conditions and remediation strategies. The USAF typically coordinates with the USEPA and other Federal, state, and local agencies to address site investigation and remediation, and *Community Involvement Plans* may be developed to inform the public of ERP activities. ERP sites where remediation has been successfully completed are deemed "closed" once the USAF and all applicable regulatory agencies sign a site closure report.

3.12.2 Existing Conditions

3.12.2.1 Pollution Prevention

The current Travis AFB *P2 MAP* outlines strategies to minimize hazardous materials use at the base and eliminate potential releases of pollution into the environment. Recycling and other waste diversion strategies are also discussed, and the document details training and awareness programs, health-based risk assessments, management of contracts and facilities, energy conservation, and pollution prevention technologies, all of which are intended to reduce or eliminate pollution at the base (USAF 2003c).

3.12.2.2 Environmental Restoration Program

ERP activities at Travis AFB began in 1983 upon establishment of the DoD IRP. Potential ERP sites were initially identified through records searches, personnel interviews, and preliminary reconnaissance. RIs were subsequently conducted to evaluate each site for existing conditions, potential risks, and possible remediation strategies. To date, a total of 34 ERP sites have been identified at 38 on-base locations, as shown on Figure 3-11. Contamination at these sites resulted from a variety of past activities, including operations and maintenance, solid waste disposal, fire training, and leaking USTs (USAF 2006b).

Management of ERP sites at Travis AFB is divided into two geographical units, developed central areas (*North/East/West Industrial Operable Unit* [NEWIOU]) and undeveloped peripheral areas (*West/Annexes/Basewide Operable Unit* [WABOU]) (Figure 3-11). Both the NEWIOU and WABOU were subject to groundwater and soil RIs for which RODs were recorded. Following these RIs, a number of remediation activities were initiated, including: UST and solid waste removal; the treatment of soil, surface water, and groundwater; and, land use controls to restrict site access and use. Remediation of soil and/or groundwater is ongoing at over 25 on-base ERP sites. To date, a total of three sites have been closed, four are classified as *No Further Action*, and nine are subject to land use and access restrictions[3] (USAF 2006b). Refer to *Appendix L* for a complete list of identified ERP sites at Travis AFB.

<u>Area of Potential Effect (APE)</u>

ERP Site LF044, *Landfill X*, is partially located within the approximately 38.29-acre APE, as previously described in Sections 3.5, 3.6, and 3.8. Two additional sites—DP039, *Building 755*, and SS046, *Railhead Munitions Staging Area*—are located within 0.25 mile of the APE, as shown on Figure 3-11 (USAF 2006b). Information on ERP Sites DP039 and SS046 is summarized in Table 3-29, and ERP Site LF044 is discussed in detail below.

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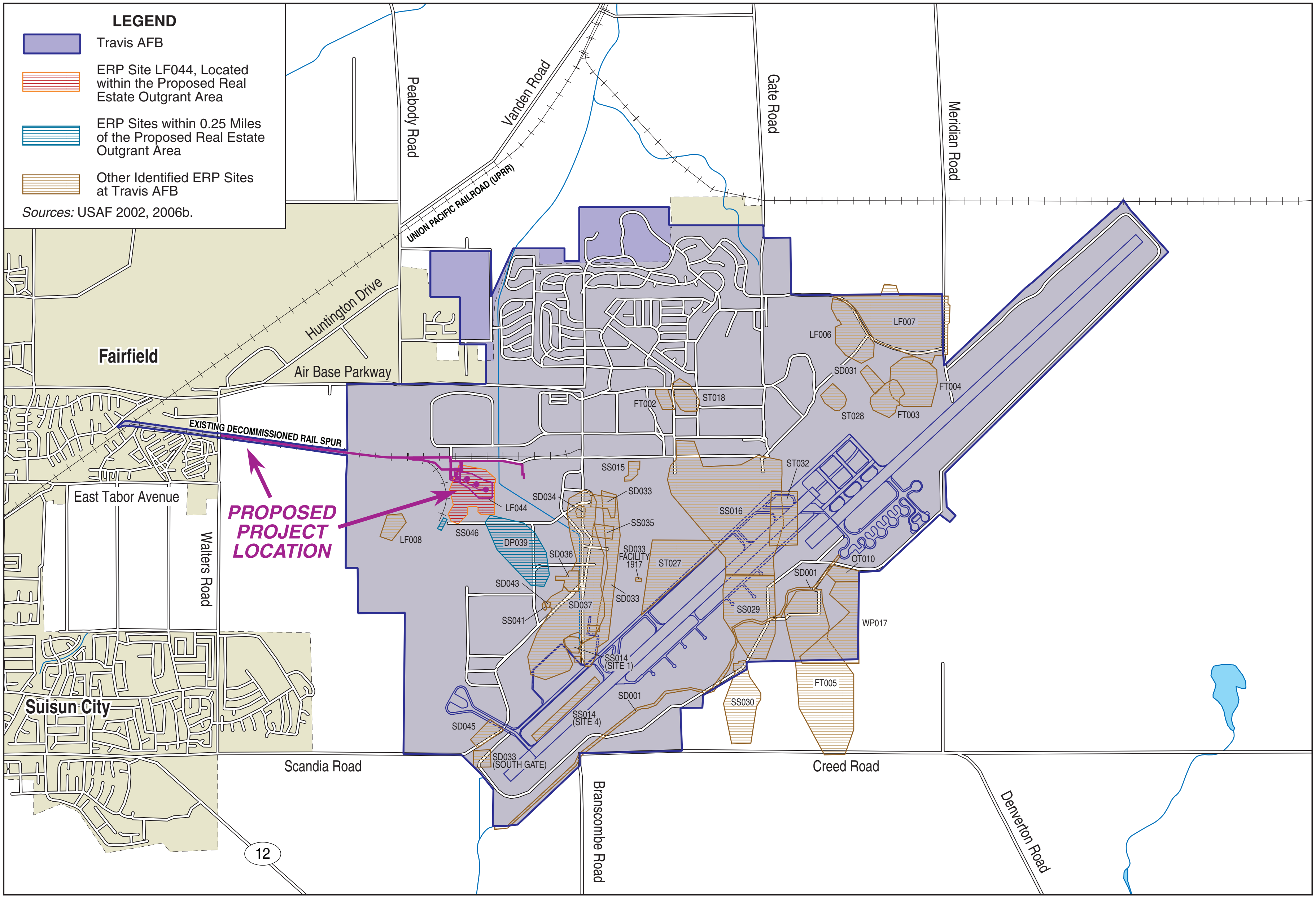
[3] *Land use and access restrictions* are legally-binding remedial actions selected as part of a ROD. Such restrictions limit the types of activities (e.g., soil disturbance) or uses (e.g., residential development) that can occur on a specified ERP Site. In some instances, no further remediation is required at a site beyond the institution of land use and access restrictions (USAF 2006a).

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



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Identified Environmental Restoration Program (ERP) Sites at Travis Air Force Base

FIGURE 3-11

Table 3-29 ERP Sites in the Vicinity of the Area of Potential Effect (APE)

ERP Site	Distance from APE	Description	Status
DP039: *Building 755*	<0.25 mile	Building 755 formerly housed an acid neutralization sump. A groundwater plume beneath the building was contaminated with trichloroethylene, and surface soils contain elevated levels of Pb.	Land use and access restrictions have been instituted at the site to prevent unauthorized entry or soil disturbance. Remediation of groundwater is ongoing and no final remedy has been selected.
SS046: *Railhead Munitions Staging Area*	<0.25 mile	Site formerly used for the temporary storage of munitions. Site soils contain metals and polycyclic aromatic hydrocarbons.	Land use and access restrictions have been instituted at the site to prevent unauthorized entry or soil disturbance. Remediation of soil not yet addressed.

Sources: USAF 2002, 2006b, 2008h.

ERP Site LF044

The proposed Travis Terminal footprint would be partially located within ERP Site LF044, *Landfill X* (refer to Figure 3-11). The site was not an actual landfill; rather, it was used from the early 1960s to the late 1990s to stockpile construction debris such as asphalt and concrete. Constituents from these materials—metals and SVOCs—have been found in site soils and may pose a risk to human health and the environment (USAF 2002). The site is currently being used as a heavy equipment training area (USAF 2008h).

A 1996 RI determined that ERP Site LF044 does not require active remedial action because levels of metals and SVOCs do not exceed industrial cleanup levels. Four groundwater monitoring wells installed in the vicinity of the site during the RI failed to detect contamination resulting from former activities at *Landfill X* (USAF 1997); these wells have been inactive since the 1996 RI (refer to Section 3.5, *Water Resources*). The 2002 *Soil ROD for the WABOU* selected the institution of land use and access restrictions at the site to prevent unauthorized entry or soil disturbance, as well as development of non-industrial uses at the site (USAF 2002). In addition, a protective concrete berm was installed along the northern perimeter of the site to prevent soil contamination from migrating to adjacent areas via surface runoff (USAF 2008h).

The estimated hazard to human health from soil contamination at ERP Site LF044 is considered low as long as site workers wear appropriate protective equipment (USAF 2002). With regard to ecological health, potential exposure is expected to be minimal because surface soil contamination at the site is low and runoff is controlled. Further, all soil contaminants at ERP Site LF044 are below concentrations which would potentially impact groundwater (USAF 1997, 2002).

3.12.2.3 Geological Resources

Geological resources consist of surface and subsurface materials and their properties. Principal geologic factors affecting the ability to support structural development include

soil stability, structure, elasticity, shrink-swell potential, and erodibility. Soils are typically described in terms of their permeability, slope, composition of types, and relative compatibility or constraining properties with regard to particular construction activities and types of land use. Topography is the change in elevation over the surface of a land area. Topography is influenced by many factors, including human activity, underlying geologic material, seismic activity, climatic conditions, and erosion. A discussion of topography typically includes a description of surface elevations, slope, and distinct physiographic features (e.g., mountains), and their influence on human activities.

Regional Setting

Solano County is comprised of two distinct physiographic regions: the eastern terminus of the Coast Range, and the Sacramento Valley interior lowland. Gently sloping Coast Range foothills comprise the northern and western portions of the County; elevations generally range between 300 and 1,500 feet above mean sea level (msl), with some relief as high as 2,500 feet above msl. Geologically, the western portion of the County is wholly comprised of Tertiary sedimentary rocks; northern portions of the County contain a mix of Mesozoic sedimentary rocks and Tertiary and Quaternary volcanic rocks. Soils in these areas are generally well-drained with varied slopes (Solano County 2006g). The remainder of the County is comprised of the Sacramento Valley region; topography in the central and eastern portions of the County is generally flat, with elevations ranging from 10 to 250 feet above msl; the southernmost portions of the County are all 10 feet above msl or less, with some areas containing elevations slightly below msl. Geologically, the flat portions of the County are comprised mostly of Quaternary sediments, with some Tertiary deposits. Soils in these areas generally contain gentle to moderate slopes, and drainage varies from moderate to somewhat poor (Solano County 2006g).

Travis AFB

The topography of Travis AFB slopes upward to the north, with elevations varying from 15 feet above msl in the southwest corner to approximately 200 feet above msl along the northern boundary. Geologically, the base is situated on Quaternary sediments consisting of unconsolidated silty clays at the surface, and silts and fine sands at 15 to 20 feet bgs (USAF 2003a). The average depth to groundwater at Travis AFB varies from 5 to 30 feet bgs (USAF 2003c).

Soils at Travis AFB generally consist of well-drained, highly impermeable sandy clay loams from the San Ysidro or Antioch-San Ysidro complexes. The western part of the base has large areas of Altamont-San Ysidro-San Benito Complex soils, characterized as well-drained silty clays with slow permeability. Soils in the northern part of the base are mostly of the well-drained, highly impermeable Corning Gravelly Loam and Diablo-Los Osos Loam complexes (USAF 2003a). Table 3-30 summarizes the location and properties of surface soils at Travis AFB.

Table 3-30 Properties of Surface Soils at Travis Air Force Base

Soil Name	Properties	Location
Altamount-San Ysidro-San Benito Complex	-well-drained -clay surface layer -extremely hard siltstone subsoil -slow permeability	West Part[1]
Antioch-San Ysidro Complex (Regular and Thick Phase)	-moderately well-drained -loamy surface layer -clay subsoil -very slow permeability	Majority of Travis AFB[1]
Capay Silty Clay Loam	-moderately well-drained -layers of clay to a depth of greater than 100 inches -slow permeability	South Perimeter
Clear Lake Clay	-poorly drained clays -slow permeability	West Part
Corning Gravelly Loam	-well-drained -loamy surface layer -clay subsoil -gravelly sandy loam sublayer -slow permeability	North Perimeter
Dibble-Los Osos Clay Loam, Dibble-Los Osos Loam	-well-drained -clay surface layer -clay loam subsoil; sandstone sublayer -slow permeability	North Part/ Perimeter
Millsap Sandy Loam	-well-drained -sandy loam surface layer -clay subsoil -very hard sandstone sublayer -very slow permeability	Central/ East Parts
Millsholm Loam	-well-drained -loamy surface -moderate permeability	North Part
Omni Clay Loam	-poorly drained -strongly alkaline surface layer -calcareous silty clay sublayer -slow permeability	West Part[1]
Pescadero Clay Loam	-somewhat poorly drained -clay surface layer -saline/alkaline clay loam sublayer -slow subsoil permeability	West Part[1]
San Ysidro Sandy Loam	-moderately well-drained -fine sandy clay loam surface layer -heavy clay loam sublayer -very slow permeability	Southeast, West Parts[1]
Solano Loam	-somewhat poorly drained -loamy surface layer -silty clay loam sublayer -very slow permeability	Northwest Perimeter

[1] Soil type is found within the APE.
Source: USAF 2003a.

Area of Potential Effect (APE)

Soils in the 38.29-acre APE, as previously described in Section 3.5, *Water Resources*, are mostly of the *Antioch-San Ysidro Complex*. Additional soils found in the APE include the *Altamount-San Ysidro-San Benito Complex*, *Omni Clay Loam*, *Pescadero Clay Loam*, *San Ysidro Sandy Clay Loam*, and *Antioch-San Ysidro Complex (Thick Phase)* (USAF 2003a). Figure 3-12 shows the approximate location of surface soils in the vicinity of the APE. Refer to Table 3-30 for soil properties information.

Topography along the proposed Travis Pipeline footprint is generally flat, with elevation sloping slightly downward to the west and varying from approximately 45 to 55 feet above msl. Topography of the proposed Travis Terminal footprint is more varied, sloping upward to the southeast at elevations of approximately 60 to 75 feet above msl (USAF 2003a).

3.13 ENVIRONMENTAL JUSTICE

3.13.1 Definition of Resource

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations,* was issued to focus attention of Federal agencies on human health and environmental conditions in minority and low-income communities and to ensure that disproportionately adverse human health or environmental effects on these communities are identified and addressed. Since children may suffer disproportionately from environmental health and safety risks, EO 13045, *Protection of Children from Environmental Health and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health and safety risks that may affect children and to ensure that Federal agencies' policies, programs, and activities address environmental health and safety risks to children.

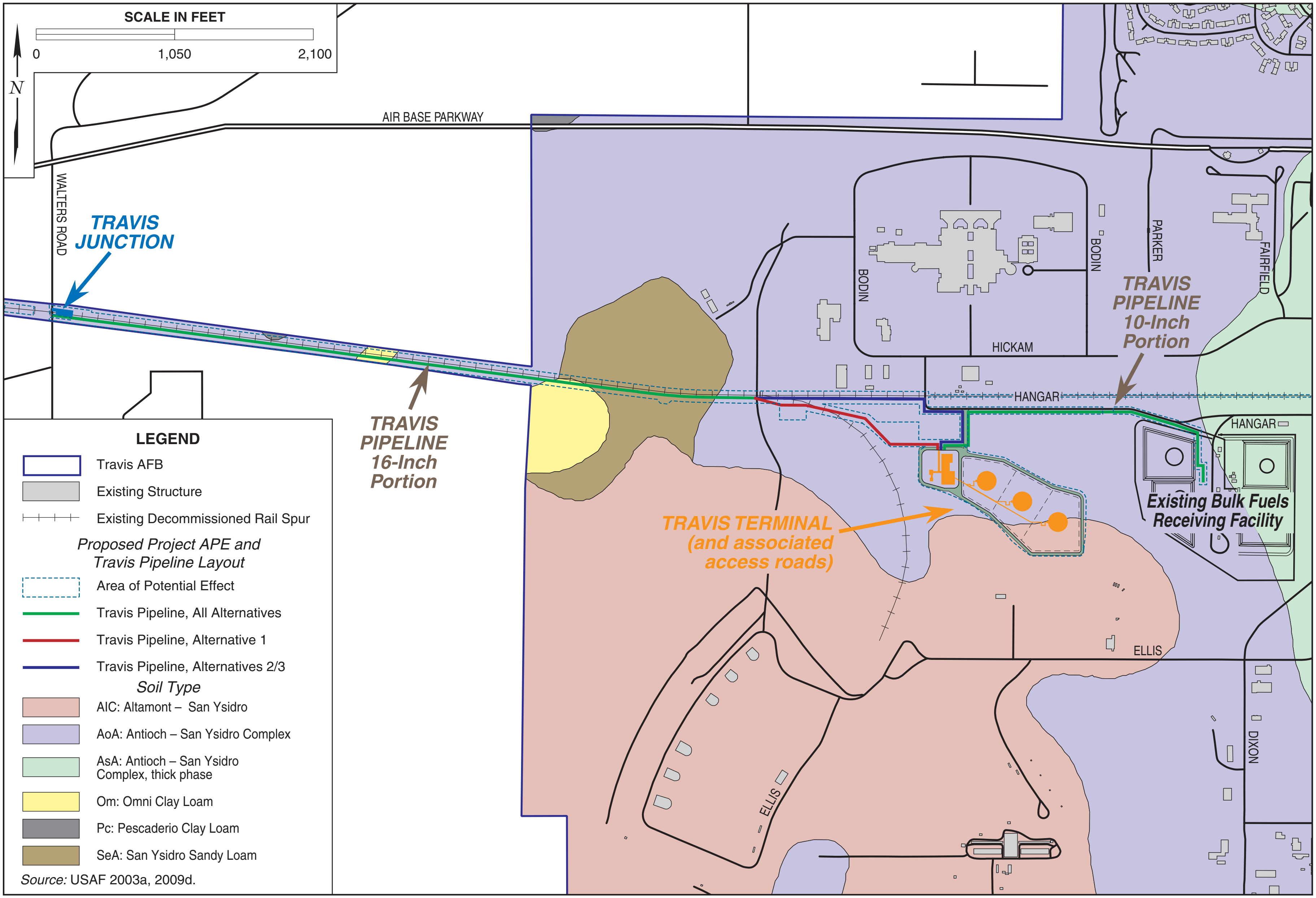
Data used for this analysis were collected from the 2000 *Census of Population and Housing*; although these data are over 9 years old, they represent the most complete, detailed, and accurate statistics available which address population distribution and income. Further, there are no indications that regional trends occurring since 2000 have significantly altered general population characteristics.

3.13.2 Existing Conditions

Environmental justice data are provided for Solano County and the cities of Fairfield and Suisun City. All three of these regions have populations that could potentially be affected by implementation of the Proposed Action or a project alternative.

3.13.2.1 Minority and Low-Income Populations

In order to comply with EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, ethnicity and poverty status in Solano County, Fairfield, and Suisun City were compared to state and national data to determine if any minority or low-income communities could potentially be disproportionately affected by the Proposed Action or a project alternative.



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Surface Soils in the Vicinity of the Proposed Project Area of Potential Effect (APE)

FIGURE 3-12

Minority Populations

The percentage of minority residents in Suisun City (61.4 percent) was the highest among the five geographic areas examined in this analysis (Table 3-31). By comparison, minority residents made up a somewhat lower percentage of the total population in Fairfield (51.0 percent), Solano County (50.8 percent), and the State of California (53.3 percent). The nation had the lowest percentage of minority residents (30.9 percent) (U.S. Census Bureau 2000).

Table 3-31 Environmental Justice Data

Population Characteristics	Geographical Area				
	United States	California	Solano County	Fairfield	Suisun City
Minority Population (2000)					
Minority Population[1]	**86,869,132 (30.9%)**	**18,054,858 (53.3%)**	**200,260 (50.8%)**	**49,084 (51.0%)**	**16,027 (61.4%)**
Hispanic/Latino[2]	35,305,818 (12.5%)	10,966,566 (32.4%)	69,598 (17.6%)	18,050 (18.8%)	4,652 (17.8%)
Asian-American	10,123,169 (3.6%)	3,648,860 (10.8%)	49,399 (12.5%)	10,277 (10.7%)	4,415 (17.3%)
African-American	33,947,837 (12.1%)	2,181,926 (6.4%)	57,597 (14.6%)	14,097 (14.7%)	4,094 (18.8%)
Native American/ Alaska Native	2,068,833 (0.7%)	178,984 (0.5%)	2,194 (0.6%)	518 (0.5%)	126 (0.5%)
Native Hawaiian/ Pacific Islander	353,509 (0.1%)	103,736 (0.3%)	2,859 (0.7%)	851 (0.9%)	253 (1.0%)
Other/Multi-Racial[3]	5,069,916 (1.8%)	974,796 (2.9%)	18,613 (4.7%)	5,291 (5.5%)	1,577 (6.0%)
Non-Minority Population[4]	194,552,774 (69.1%)	15,816,790 (46.7%)	194,282 (49.2%)	47,094 (49.0%)	10,091 (38.6%)
Total Population	281,421,906	33,871,648	394,542	96,178	26,118
Poverty Characteristics (1999)					
Population Below Poverty Level	**33,899,812 (12.4%)**	**4,706,130 (14.2%)**	**31,344 (8.3%)**	**8,496 (9.3%)**	**1,667 (6.5%)**
Total Population	273,882,232	33,100,044	378,431	91,741	25,741
Age Characteristics (2000)					
Population of Children Below Age 18	**72,293,812 (25.7%)**	**9,249,829 (27.3%)**	**111,852 (28.3%)**	**28,659 (29.8%)**	**8,499 (32.5%)**
Total Population	281,421,906	33,871,648	394,542	96,178	26,118

[1] *Minorities* are persons classified by the U.S. Census Bureau as Hispanic/Latino, Asian-American, African-American, Native American, Alaska Native, Native Hawaiian, Pacific Islander, Other Race, or Multi-Racial.
[2] *Hispanic/Latinos* are persons of any racial background with a Hispanic/Latino cultural heritage.
[3] *Other/Multi-Racial* includes persons of two or more races and persons of races not categorized above.
[4] *Non-Minority Population* includes persons who are White, European-American, and/or Middle Eastern.
Sources: U.S. Census Bureau 1999, 2000.

Low-Income Populations

The percentage of Solano County's population living below the poverty level in 1999 was 8.3 percent, the second-lowest percentage of the five geographic areas examined in this analysis (Table 3-31). Fairfield reported a similar poverty level (9.3 percent), and the

poverty level reported in Suisun City was slightly lower (6.5 percent). The highest poverty levels were reported for the State of California (14.2 percent) and the nation (12.4 percent) (U.S. Census Bureau 1999).

3.13.2.2 Protection of Children from Environmental Health and Safety Risks

In order to comply with EO 13045, *Protection of Children from Environmental Health and Safety Risks*, the percentages of children under age 18 in Solano County and the cities of Fairfield and Suisun City were examined and compared to state and national levels. Additionally, on-base and off-base locations where populations of children may be concentrated (e.g., schools, parks, and hospitals) were identified within 2 miles of the *composite outgrant area*. The purpose of this analysis is to address potential disproportionate health and safety risks to children that may result from the Proposed Action or a project alternative.

Age Distribution

The percentage of the total population represented by children under age 18 in Suisun City (32.5 percent) was the highest among the five geographic areas examined in this analysis (Table 3-31). By comparison, children under 18 made up a slightly lower percentage of the total population in Fairfield (29.8 percent), Solano County (28.3 percent), and California (27.3 percent). The nation had the lowest percentage of children under 18 (25.7 percent) (U.S. Census Bureau 2000).

Schools, Parks and Recreational Facilities, and Hospitals

Travis Unified School District (USD) serves Travis AFB and off-base areas to the north. There are seven on-base district facilities, all of which are located within 2 miles of the *composite outgrant area* (Table 3-32): three elementary schools, one middle school, one high school, and two alternative high schools (Travis USD 2008). District-wide enrollment exceeded 5,300 students in the 2007-08 academic year (California Department of Education [CDE] 2008).

Fairfield and Suisun City are served by the Fairfield-Suisun Unified School District (FSUSD), a district with over 30 facilities and nearly 23,000 students enrolled in 2007-08 (CDE 2008; FSUSD 2008). Four FSUSD facilities are located within 2 miles of the outgrant area.

Various on-base parks and recreational facilities are located within 2 miles of the *composite outgrant area*, including softball fields, a skateboard park, and a youth center (Table 3-32). The DGMC is located less than 0.25 mile north of the outgrant area (USAF 2006a).

Multiple parks and recreational facilities in Fairfield and Suisun City are located within 2 miles of the *composite outgrant area* (Fairfield 2008; Suisun City 2006).

Table 3-32 Schools, Parks and Recreation Facilities, and Hospitals Located within 2 Miles of the Composite Outgrant Area

Facility Name	Facility Type	Distance from Outgrant Area
Travis Air Force Base		
Travis Elementary School	K-6 School (592 enrolled[1])	<0.25 mi N
Golden West Middle School	7-8 School (849 enrolled[1])	0.75 mi N
Scandia Elementary School	K-6 School (455 enrolled[1])	1.0 mi NE
Travis Community Day School	Alternative School (16 enrolled[1])	1.0 mi N
Travis Education Center	Alternative School (69 enrolled[1])	1.0 mi N
Center Elementary School	K-6 School (474 enrolled[1])	1.25 mi NW
Vanden High School	9-12 School (1,545 enrolled[1])	1.25 mi N
"FamCamp" Family Campground	Parks/Recreation	0.25 mi NE
Softball Fields	Parks/Recreation	0.25 mi NE
Eucalyptus Park	Parks/Recreation	0.5 mi E
Skateboard Park	Parks/Recreation	0.75 mi N
Youth Center	Parks/Recreation	0.75 mi N
Fitness Center	Parks/Recreation	1.5 mi E
Duck Pond Park	Parks/Recreation	1.75 mi NE
David Grant Medical Center (DGMC)	Hospital	<0.25 mi N
Off-Base Areas		
Tolenas Elementary School	K-6 School (689 enrolled[1])	0.75 mi SW
Dan O. Root Elementary School	K-6 School (782 enrolled[1])	1.5 mi SW
Glenn Richardson Elementary School	K-6 School (561 enrolled[1])	1.5 mi W
Grange Middle School	7-8 School (549 enrolled[1])	1.5 mi W
Tolenas Park	Parks/Recreation	0.5 mi W
Meadow Park	Parks/Recreation	0.75 mi W
Patriot Park	Parks/Recreation	0.75 mi S
Geopp Park	Parks/Recreation	1.5 mi SW
Montebello Vista Park	Parks/Recreation	1.5 mi S
Tabor Park	Parks/Recreation	1.5 mi W
Laurel Creek Park	Parks/Recreation	1.75 mi NW
Irving H. Lambrecht Sports Complex	Parks/Recreation	1.75 mi S

[1] Enrollment is for the 2007-08 academic year (CDE 2008).
Sources: Fairfield 2008; FSUSD 2008; Suisun City 2006; Travis USD 2008; USAF 2006a.

SECTION 4
ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

Environmental impacts that would result from outgrant of real estate and construction of the proposed JP-8 pipeline, receiving facility, and associated ancillary equipment at Travis AFB are evaluated in this section. Impacts analyses are presented by resource area, as described in Section 3, *Affected Environment.* Analyses for the proposed *Travis Terminal* and *Travis Junction* are presented once for each resource area since installation of these project components would be the same under each proposed alternative. Analyses for the proposed *Travis Pipeline* are presented for each proposed alternative. In addition, *Mitigation* and *Cumulative Impacts* are presented for each proposed alternative. Because construction and other changes to the physical environment at the proposed *Concord Station* would be very limited, it was excluded from discussion to keep the analysis relevant and concise.

4.2 AIR QUALITY

Impacts to air quality in attainment areas would be considered significant if emissions associated with implementation of a Proposed Action or project alternative caused or contributed to a violation of any Federal, state, or local ambient air quality standard; represented an emissions inventory increase of 10 percent or more in the affected Air Quality Control Region (AQCR); exposed sensitive receptors to substantially increased concentrations of emissions; or, exceeded any significance criteria established by the *SIP*. Impacts to air quality in nonattainment areas would be considered significant if the net change in emissions caused or contributed to a violation of any Federal, state, or local ambient air quality standard; increased the frequency or severity of a violation of any ambient air quality standard; or, delayed the attainment of any standards established by the *SIP*. With respect to the USEPA *General Conformity Rule*, impacts to air quality would be considered significant if emissions increased a nonattainment or maintenance area's emissions inventory by 10 percent or more for individual nonattainment pollutants; or exceeded *de minimis* threshold levels established in 40 CFR § 93.153(b) for individual nonattainment pollutants or pollutants for which an area has been redesignated as a maintenance area.

4.2.1 Local Regulatory Setting

Travis AFB is located in a geographical area governed by the BAAQMD. In addition to the USEPA NAAQS, emissions within BAAQMD jurisdiction are regulated by the CARB CAAQS. A conformity review would be required in BAAQMD jurisdiction when a proposed project generates emissions in an AQCR designated as a nonattainment or maintenance area for one or more NAAQS or CAAQS. Thresholds of significance to assess potential emissions associated with a proposed project have been established by the BAAQMD (BAAQMD 1999) and are described below. BAAQMD thresholds of

significance are used to assess construction and operational emissions for the proposed Travis Terminal and Travis Junction. In addition, construction and operational emissions for installation of the Travis Pipeline are assessed separately for the Proposed Action and each project alternative.

4.2.1.1 Thresholds of Significance

Construction Emissions

The BAAQMD acknowledges CO and O_3 resulting from construction-related combustion emissions when determining thresholds of significance for proposed projects. However, the agency's primary emphasis is on fugitive dust (i.e., PM_{10}, a criteria pollutant) generated from construction activities. The BAAQMD approach for determining the threshold of significance for construction-related fugitive dust is based on the implementation of effective and comprehensive control measures rather than a detailed quantification of potential dust emissions. The BAAQMD has identified three sets of feasible control measures for fugitive dust which are implemented, as relevant, during construction activities (BAAQMD 1999). The measures are outlined below.

The following *Basic Control Measures* are to be implemented at all construction sites (BAAQMD 1999):

- Water all active construction areas at least twice daily;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Pave, apply water three times daily, or apply soil stabilizers on all unpaved access roads and parking and staging areas at construction sites;
- Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites; and,
- Sweep daily (with water sweepers) if visible soil material is carried onto adjacent public streets.

The following *Enhanced Control Measures* are to be implemented at construction sites greater than 4 acres (BAAQMD 1999):

- All *Basic Control Measures* outlined above;
- Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more);
- Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.);
- Limit traffic speeds on unimproved surfaces to 15 miles per hour (mph);
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways; and,
- Replant vegetation in disturbed areas as quickly as possible.

In addition, the following *Optional Control Measures* are strongly encouraged for implementation at large or sensitive construction sites (BAAQMD 1999):

- Install wheel washers for all exiting trucks, or wash off tires or tracks of all trucks and equipment leaving the site;
- Install wind breaks, or plant trees/vegetative windbreaks at windward side(s) of construction areas;
- Suspend excavation and grading activity when winds (instantaneous gusts) exceed 25 mph; and,
- Limit the area subject to excavation, grading and other construction activity at any one time.

Operational Emissions

The BAAQMD provides quantitative thresholds of significance levels to evaluate ongoing operation of proposed projects. These thresholds must consider both direct emissions associated with ongoing project operations, as well as indirect emissions sources such as motor vehicles traveling to and from the project site (BAAQMD 1999). BAAQMD operational significance thresholds are presented in Table 4-1.

Table 4-1 BAAQMD: Thresholds of Significance for Project Operations

Pollutant	tpy	lbs/day	kg/day
ROG	15	80	36
NO_x	15	80	36
PM_{10}	15	80	36

Source: BAAQMD 1999.

In addition to the significance thresholds above, there are several other pertinent requirements for evaluating operational emissions under BAAQMD:

- Project must evaluate localized CO levels of CO emissions from vehicles would exceed 550 pounds (lbs)/day;
- Projects should evaluate the potential for odor impacts;
- TACs should not have a probability of cancer risk of greater than ten in one million nor a hazard index greater than one for the maximum exposed individual;
- Acutely hazardous materials should be evaluated for accidental releases; and,
- Cumulative impacts should be assessed.

4.2.1.2 Emissions Thresholds and Permitting

Travis AFB operates under a BAAQMD *Synthetic Minor Facilities Permit* (under *Plant #770*) which contains provisions to limit the base's potential emission levels to below defined thresholds, notably 34 tpy for emissions of POCs (i.e., NO_x and ROGs). Some facilities at the base (e.g., the DGMC) operate under separate BAAQMD permits

containing provisions specific to those facilities (USAF 2003b, 2009b). Emissions from implementation of the Proposed Action and or a project alternative would be subject to a separate BAAQMD permit granted specifically to SFPP for operation of the proposed project components. Emissions from the operation of the proposed project components would be limited to POCs, primarily from the transfer and storage of JP-8. The storage of JP-8 is exempt from BAAQMD Regulation 8-5, *Storage of Organic Liquids*, when maximum daily emissions are below 10 lbs/highest day, and it is typically allowed to be stored in fixed-roof tanks due to its low vapor pressure (BAAQMD 2002). However, due to the volume of JP-8 storage proposed, it is anticipated that proposed project components would result in maximum daily emissions in excess of the permit-exempt threshold of 10 lbs/highest day (USAF 2009b). For this reason and to maintain the integrity of product being stored, SFPP would construct floating roof tanks and seek a permit from the BAAQMD.

4.2.2 Components Common to All Proposed Alternatives

4.2.2.1 Travis Terminal

Construction Emissions

Construction activities associated with the Travis Terminal would result in both combustion and fugitive dust emissions. To estimate emissions, construction activities were divided into four categories: initial site preparation, earthmoving, foundation construction, and tank installation.

Potential fugitive dust emissions were estimated using an emission rate of 0.11 tons PM_{10} per acre per month, plus 0.059 tons PM_{10} per 1,000 square yards of onsite cut/fill (USAF 2009b). Potential combustion emissions were estimated using USEPA AP-42 emission factors, the South Coast Air Quality Management District *Air Quality Handbook*, and assumptions based upon previous similar projects (USAF 2009b). Emissions were calculated for CO, NO_x, SO_x, and ROGs equivalent to what is defined as a POC by the BAAQMD. Emissions estimates included all equipment associated with project construction activities, as well as estimated vehicle emissions resulting from construction personnel traveling to and from the project site (USAF 2009b). Estimated total Travis Terminal construction emissions are presented in Table 4-2. Refer to *Appendix M* for detailed emissions calculations.

Emissions resulting from construction of the Travis Terminal would be temporary and transient, and the short-term exposure levels would be minimal. Further, the BAAQMD does not consider combustion emissions when determining thresholds of significance for a proposed project as long as they do not impede attainment or maintenance of standards within the AQCR. With implementation of BAAQMD's control measures outlined above, fugitive dust emissions would be considered below thresholds of significance. Accordingly, impacts to air quality associated with construction of the Travis Terminal would be less than significant.

Table 4-2 Travis Terminal: Estimated Construction Emissions

	CO		NO_x		PM_{10}		SO_x		ROG	
	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy
Initial Site Preparation	69.05	1.55	97.02	2.18	3.18	0.07	6.41	0.14	10.80	0.24
Earthwork	70.02	3.15	100.61	4.53	97.76	4.40	9.60	0.43	10.98	0.49
Foundation	61.57	1.85	66.61	2.00	2.68	0.08	3.85	0.12	9.51	0.29
Tank Construction	93.33	11.20	190.29	22.83	6.94	0.83	24.91	2.99	18.54	2.22
Annual Total		**17.75**		**31.54**		**5.38**		**3.68**		**3.25**

lbs/day = pounds per day
tpy = tons per year
Source: USAF 2009b.

Operational Emissions

Operational emissions for the Travis Terminal were estimated by considering the following equipment which would be installed at the terminal (USAF 2009b):

- Three 150,000-BBL ASTs with internal floating roofs;
- Incoming meter and prover;
- Particulate filters and filter separators downstream of the tanks;
- Clay treaters located between the particulate filter and filter separator;
- 13,000-gal tank and injection facilities for adding FSII;
- 350-gal tote and injection facilities for adding CI;
- 350-gal tote and injection facilities for adding SDA;
- Two shipping pumps to transfer product;
- Transfer meter and prover;
- 100-BBL drain sump and pump; and,
- 25-BBL drain sump and pump.

To estimate emissions for the equipment above, baseline data on JP-8 throughput at Travis AFB were collected from December 2006 to August 2008. The baseline throughput was then adjusted to allow for future growth and safety scenarios; this "adjusted" throughput was subsequently inputted in the USEPA *TANKS* model (version 4.09d) to estimate operational emissions associated with the equipment listed above (USAF 2009b).

Table 4-3 presents the estimated operational emissions for the Travis Terminal. In summary, total emissions were calculated at approximately 2.88 lbs/day, or approximately 0.53 tpy, which would be well below BAAQMD operational thresholds and much less than 10 percent of the 100 tpy for Federal conformity (USAF 2009b). Refer to *Appendix M* for detailed emissions calculations.

Table 4-3 Travis Terminal: Estimated Operational Emissions

Project Component	lbs/day	tpy
(3) 150,000-BBL JP-8 ASTs with Floating Roofs	2.1	0.39
FSII Storage Tank	0.0094	0.0017
(2) 350-Gal Totes	0.00072	0.00013
Fugitive Components	0.65	0.12
Prover/Sumps	0.11	0.02
TOTAL	**2.88**	**0.53**
BAAQMD Thresholds	80	15
Significant?	***NO***	***NO***

lbs/day = pounds per day
tpy = tons per year
Source: USAF 2009b.

The emissions listed above would include fugitive emissions from piping and equipment at Travis Terminal. POC emissions estimates for equipment such as pump seals, valves, flanges, and sumps were calculated using the factors from the USEPA's *Protocol for Equipment Leak Estimates* (USEPA 1995). These factors assume very conservative vapor pressures such as those typically associated with gasoline (USAF 2009b). Accordingly, actual emissions from fugitive components would likely be much less than the total presented in Table 4-4. However, total POC emissions of 238 lbs/year would still be insignificant when compared to BAAQMD operational thresholds (USAF 2009b). Refer to *Appendix M* for detailed emissions calculations.

Table 4-4 Travis Terminal: Estimated Fugitive Operational Emissions

Component	Quantity	Emission Factor (kg/hr/source)	VOC Emissions (lb/year)
Flanges	200	0.000008	30.9
Pump Seals	9	0.00054	93.8
Valves	70	0.000043	58.1
Other Components	22	0.00013	55.2
TOTAL			**238.0**

kg/hr/source = kilograms per hour per source
lbs/year = pounds per year
Source: USAF 2009b.

Emissions resulting from operation of the Travis Terminal would be well below BAAQMD operational thresholds and much less than 10 percent of the 100 tpy for Federal conformity. Fugitive operational emissions would be negligible. In addition, the floating roof tank design would be subject to applicable sections of BAAQMD Regulation 8-5, *Storage of Organic Liquids* (BAAQMD 2002). The use of floating roof tanks would also limit operational emissions to levels well below normal permit exemption thresholds. While these emissions would not be subject to the emission cap currently permitted for the base by the BAAQMD, the amount of emissions associated with the Travis Terminal would not significantly impede the emission cap (USAF 2009b).

Consequently, impacts to air quality associated with operation of the Travis Terminal would be less than significant.

4.2.2.2 Travis Junction

Construction Emissions

Combustion emissions resulting from construction of the Travis Junction would be negligible and would not impede attainment or maintenance of standards within the AQCR; further, all fugitive dust emissions would be subject to BAAQMD's control measures outlined above (USAF 2009b). Accordingly, impacts to air quality associated with construction of the Travis Junction would be less than significant.

Operational Emissions

Operational emissions associated with the Travis Junction would be limited to aboveground connectors to the pipeline (USAF 2009b). Emissions would be negligible, and no significant impacts to air quality would result.

4.2.2.3 Toxic Air Contaminants

Operational emissions for all project components were estimated for five TACs using the USEPA *TANKS* model. Estimates were compared to the BAAQMD acute and chronic trigger levels. Because estimates would not vary significantly for each alternative, they are included in the *Components Common to All Proposed Alternative* section. Estimates for emissions of TACs were developed using the USEPA *TANKS* model (version 4.09d). Emissions of TACs would result from two sources at the Travis Terminal: diurnal changes in temperature that would result in evaporative emissions and the clinging of product to the tank during floating roof movement that would result in withdrawal emissions. As shown on Table 4-5, no BAAQMD triggers were exceeded for any TAC (USAF 2009b). Therefore, impacts to air quality associated with operational TACs would be less than significant. Refer to *Appendix M* for detailed emissions calculations.

Table 4-5 Operational Toxic Air Contaminants (TACs) for All Project Components

Contaminant	lbs/hr	BAAQMD Acute Trigger Level (lbs/hr)	lbs/yr	BAAQMD Chronic Trigger Level (lbs/yr)
Benzene	0.002	2.9	0.6	6.4
Ethylbenzene	0.008	N/A	3.0	77,000
n-Hexane	0.004	N/A	1.3	270,000
Toluene	0.002	82.0	6.8	12,000
m-Xylene	0.002	49.0	6.6	27,000

lbs/hr = pounds per hour
lbs/year = pounds per year
N/A = no value available
Source: USAF 2009b.

4.2.3 Alternative 1 – Proposed Action

4.2.3.1 Travis Pipeline

<u>Construction Emissions</u>

Under the Proposed Action, estimated potential emissions associated with construction of the Travis Pipeline were divided into two categories: pipeline installation and earthwork. Calculation of construction emissions under this alternative assumed that a total of 0.8 mile of excavation would occur along the pipeline footprint, 75 feet would be cleared along excavated areas, 100 feet of pipeline would be installed in one day, and the pipe would be delivered by pipe-stringing trucks and set in place by sideboom tractors. Emissions also consider welding equipment, backfill tractors, vehicles driven to and from the project site, and on-site water trucks (USAF 2009b). Estimated total construction emissions for the Travis Pipeline under the Proposed Action are presented in Table 4-6. Refer to *Appendix M* for detailed emissions calculations.

Table 4-6 Travis Pipeline: Estimated Construction Emissions, Proposed Action

Construction Component	CO		NO_x		PM_{10}		SO_x		ROGs	
	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy
Pipeline Installation	94.31	1.99	186.42	3.94	6.74	0.14	22.33	0.47	18.38	0.39
Earthwork	69.93	1.48	100.02	2.11	124.53	2.63	9.60	0.20	10.96	0.23
Annual Total		**3.47**		**6.05**		**2.77**		**0.67**		**0.62**

lbs/day = pounds per day
tpy = tons per year
Source: USAF 2009b.

Combustion emissions resulting from construction of the Travis Pipeline under the Proposed Action would be temporary and would not impede attainment or maintenance of standards within the AQCR. Implementation of BAAQMD's control measures outlined above would reduce fugitive dust emissions below thresholds of significance. Accordingly, impacts to air quality associated with construction of the Travis Pipeline under the Proposed Action would be less than significant.

<u>Operational Emissions</u>

Under the Proposed Action, the Travis Pipeline would be constructed underground; therefore, no operational emissions or air quality impacts would result.

4.2.3.2 Mitigation

No significant impacts to air quality are expected to result from implementation of the Proposed Action. Therefore, no mitigation would be required.

4.2.3.3 Cumulative Impacts

Construction and operational emissions resulting from implementation of the Proposed Action would not impede attainment or maintenance of standards within the AQCR. The potential emissions from proposed project activities are estimated at less than 1 ton per year (tpy). In addition, project emissions would be subject to a separate permit granted specifically to SFPP for operation of the proposed project components. While these emissions would not be subject to the emission cap currently permitted for Travis AFB by the BAAQMD, the amount of emissions associated with all project components would not significantly impede the emission cap. Accordingly, construction and operational emissions resulting from the Proposed Action would not cumulatively impact air quality at Travis AFB or within the AQCR.

4.2.4 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.2.4.1 Travis Pipeline

Construction Emissions

Under Alternative 2, construction emissions were calculated under the same assumptions as the Proposed Action, except that 1.6 miles of excavation would occur along the pipeline footprint, instead of 0.8 mile. Emissions calculations also consider welding equipment, backfill tractors, vehicles driven to and from the project site, and on-site water trucks (USAF 2009b). Estimated total construction emissions for the Travis Pipeline under Alternative 2 are presented in Table 4-7. Refer to *Appendix M* for detailed emissions calculations.

Table 4-7 Travis Pipeline: Estimated Construction Emissions, Alternative 2

Construction Component	CO		NO_x		PM_{10}		SO_x		ROGs	
	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy
Pipeline Installation	88.28	3.73	178.25	7.53	6.32	4.40	22.31	0.94	17.54	0.74
Earthwork	69.93	2.95	100.02	4.22	116.66	4.92	9.60	0.40	10.96	0.46
Annual Total		**6.68**		**11.75**		**9.32**		**1.34**		**1.20**

lbs/day = pounds per day
tpy = tons per year
Source: USAF 2009b.

As with the Proposed Action, combustion emissions resulting from construction of the Travis Pipeline under Alternative 2 would be temporary and would not impede attainment or maintenance of AQCR standards. Implementation of BAAQMD's control measures would reduce fugitive dust emissions below thresholds of significance. Consequently, impacts to air quality associated with construction of the Travis Pipeline under Alternative 2 would be the same as the Proposed Action, less than significant.

Operational Emissions

Under Alternative 2, the Travis Pipeline would be constructed underground; therefore, no operational emissions or air quality impacts would result.

4.2.4.2 Mitigation

No significant impacts to air quality are expected to result from implementation of Alternative 2. Therefore, no mitigation would be required.

4.2.4.3 Cumulative Impacts

Construction and operational emissions resulting from Alternative 2 would not impede attainment or maintenance of standards within the AQCR. The potential emissions from this alternative are estimated at less than 1 tpy. In addition, project emissions would be subject to a separate permit granted specifically to SFPP for operation of the proposed project components. While these emissions would not be subject to the emission cap currently permitted for Travis AFB by the BAAQMD, the amount of emissions associated with all project components would not significantly impede the emission cap. Accordingly, construction and operational emissions resulting from Alternative 2 would not cumulatively impact air quality at Travis AFB or within the AQCR.

4.2.5 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.2.5.1 Travis Pipeline

Construction Emissions

Construction emissions calculations under Alternative 3 assumed that a total of 0.5 mile of excavation would occur along the pipeline footprint, 75 feet would be cleared along excavated areas, and 100 feet would be cleared along the aboveground portion of the pipeline footprint. Calculations also assumed that 300 feet of pipeline would be installed in one day, instead of 100 feet per day. Emissions also consider welding equipment, backfill tractors, vehicles driven to and from the project site, and on-site water trucks (USAF 2009b). Estimated total construction emissions for the Travis Pipeline under Alternative 3 are presented in Table 4-8. Refer to *Appendix M* for detailed emissions calculations.

As with the Proposed Action, combustion emissions resulting from construction of the Travis Pipeline under Alternative 3 would be temporary and would not impede attainment or maintenance of AQCR standards. Implementation of BAAQMD's control measures would reduce fugitive dust emissions below thresholds of significance. Consequently, impacts to air quality associated with construction of the Travis Pipeline under Alternative 3 would be the same as the Proposed Action, less than significant.

Table 4-8 Travis Pipeline: Estimated Construction Emissions, Alternative 3

Construction Component	CO		NO_x		PM_{10}		SO_x		ROGs	
	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy	lbs/day	tpy
Pipeline Installation	82.72	1.16	162.63	2.29	5.56	0.08	19.83	0.28	16.18	0.23
Earthwork	69.93	2.95	100.02	4.22	144.00	2.03	9.60	0.40	10.96	0.46
Annual Total		**4.11**		**6.51**		**2.11**		**0.68**		**0.69**

lbs/day = pounds per day
tpy = tons per year
Source: USAF 2009b.

Operational Emissions

Under Alternative 3, the Travis Pipeline would be constructed aboveground along the existing rail spur. Installation of the pipeline aboveground would result in negligible emissions due to a minimal number of aboveground connectors along the pipeline. However, no significant impacts to air quality would result.

4.2.5.2 Mitigation

No significant impacts to air quality are expected to result from Alternative 3. Therefore, no mitigation would be required.

4.2.5.3 Cumulative Impacts

Construction and operational emissions resulting from Alternative 3 would not impede attainment or maintenance of standards within the AQCR. The potential emissions from this alternative are estimated at less than 1 ton per year. In addition, project emissions would be subject to a separate permit granted specifically to SFPP for operation of the proposed project components. While these emissions would not be subject to the emission cap currently permitted for Travis AFB by the BAAQMD, the amount of emissions associated with all project components would not significantly impede the emission cap. Accordingly, construction and operational emissions resulting from Alternative 3 would not cumulatively impact air quality at Travis AFB or within the AQCR.

4.2.6 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.2, *Air Quality*.

4.3 NOISE

Noise impact analyses typically evaluate potential changes to existing noise environments which are instigated by implementation of a Proposed Action or project alternative. Impacts would be considered to be significant if they would result in increased noise exposure to unacceptable noise levels. An increase in noise levels due to

a new noise source can create an impact on the surrounding environment. Noise associated with a Proposed Action or project alternative is compared with existing noise to determine the magnitude of potential impacts.

4.3.1 Components Common to All Proposed Alternatives

4.3.1.1 Travis Terminal

Construction Noise

Construction of the Travis Terminal would have minor, temporary impacts on the noise environment in the vicinity of proposed construction activities. Use of heavy equipment for site preparation, excavation, and tank construction may potentially generate noise exposure above typical ambient levels in the vicinity of the terminal footprint. However, noise generation would be typical of construction activities, would last only the duration of construction activities (i.e., one year), and could be reduced through the use of equipment sound mufflers and restriction of construction activity to normal working hours (i.e., between 7:00 AM and 5:00 PM). Further, the closest noise-sensitive receptor, Travis Elementary School, is located over 0.25 mile from proposed construction activities. Therefore, noise produced by construction of the Travis Terminal would not significantly impact the surrounding noise environment.

Operational Noise

Operation of the Travis Terminal would not generate noise above typical ambient levels in surrounding areas. Therefore, no operational noise impacts would be expected to result.

4.3.1.2 Travis Junction

Construction Noise

Construction of the Travis Junction would have minimal, temporary impacts on the noise environment in the vicinity of proposed construction activities. However, construction activities would not generate noise above typical ambient levels associated with nearby Walters Road, and nearby noise-sensitive receptors (i.e., off-base residential areas to the west and south of the proposed junction footprint) would not be expected to be impacted by proposed construction activities. Accordingly, noise produced by construction of the Travis Junction would not significantly impact the surrounding noise environment.

Operational Noise

Operation of the Travis Junction would not generate noise above typical ambient levels in surrounding areas. Therefore, no operational noise impacts would be expected to result.

4.3.2 Alternative 1 – Proposed Action

4.3.2.1 Travis Pipeline

Construction Noise

Construction of the Travis Pipeline under the Proposed Action would result in minor, temporary impacts on the noise environment in the vicinity of proposed construction activities. However, noise generation would be typical of construction activities, would last only the duration of construction activities (i.e., four months), and could be reduced through the use of equipment sound mufflers and restriction of construction activity to normal working hours (i.e., between 7:00 AM and 5:00 PM). Further, the closest noise-sensitive receptors (Travis Elementary School, the DGMC, and off-base residential areas) are located at least 0.25 mile from proposed construction activities. Therefore, noise produced by construction of the Travis Pipeline under the Proposed Action would not significantly impact the surrounding noise environment.

Operational Noise

Operation of the Travis Pipeline under the Proposed Action would not generate noise above typical ambient levels in surrounding areas. Therefore, no operational noise impacts would be expected to result.

4.3.2.2 Mitigation

No significant noise-related impacts would be expected to result from the Proposed Action. Therefore, no mitigation would be required.

4.3.2.3 Cumulative Impacts

Travis AFB is an active military installation, and significant portions of the base are located within 65+ CNEL noise contours associated with aircraft activity. Ground-based activity (e.g., vehicle travel on Walters Road and other major transportation corridors) in the vicinity of the proposed project footprint further contributes to ambient noise levels. Consequently, construction and operational activities under the Proposed Action would not cumulatively impact ambient noise levels at Travis AFB or in the vicinity of the project footprint.

4.3.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.3.3.1 Travis Pipeline

Construction Noise

Noise associated with construction of the Travis Pipeline under Alternative 2 would be similar to the Proposed Action. Consequently, no significant impacts to the surrounding noise environment would result.

Operational Noise

Operation of the Travis Pipeline under Alternative 2 would not generate noise above typical ambient levels in surrounding areas. Therefore, no operational noise impacts would be expected to result.

4.3.3.2 Mitigation

No significant noise-related impacts would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.3.3.3 Cumulative Impacts

Implementation of Alternative 2 would not cumulatively impact ambient noise levels at Travis AFB.

4.3.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.3.4.1 Travis Pipeline

Construction Noise

Noise associated with construction of the Travis Pipeline under Alternative 3 would be similar to the Proposed Action. Accordingly, no significant impacts to the surrounding noise environment would result.

Operational Noise

Operation of the Travis Pipeline under Alternative 3 would not generate noise above typical ambient levels in surrounding areas. Therefore, no operational noise impacts would be expected to result.

4.3.4.2 Mitigation

No significant noise-related impacts would be expected to result from Alternative 3. Therefore, no mitigation would be required.

4.3.4.3 Cumulative Impacts

Implementation of Alternative 3 would not cumulatively impact ambient noise levels at Travis AFB.

4.3.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.3, *Noise*.

4.4 WASTES, HAZARDOUS MATERIALS, AND STORED FUELS

Impacts to hazardous wastes and materials management would be considered significant if implementation of a Proposed Action or project alternative resulted in noncompliance with applicable Federal and state regulations, or increased the amount of waste and/or materials generated or procured beyond current waste management procedures and capacities at Travis AFB. Impacts to fuels management would be significant if the established management policies, procedures, and handling capacities could not accommodate the activities associated with implementation of the Proposed Action or a project alternative.

4.4.1 Components Common to All Proposed Alternatives

4.4.1.1 Travis Terminal

<u>Hazardous Waste and Materials</u>

Construction

Construction of the Travis Terminal is expected to generate a negligible quantity of hazardous waste; however, increases would be temporary and would not result in any long-term impacts. The construction contractor would maintain records of all hazardous waste potentially generated by construction activities, and storage, transport, and disposal would follow all applicable Federal, state, and local regulations. During construction, all potentially hazardous materials associated with construction (e.g., oils, lubricants, etc.) would be stored at the contractors' staging yard in accordance with applicable hazardous and flammable storage regulations. Refueling and lubrication of construction equipment would occur at the construction contractors' staging yard or onsite in a designated and closely monitored temporary staging area. Equipment would also be regularly checked for leakage, and no refueling or lubrication of equipment would occur within 250 feet of identified sensitive habitat areas.

In the event of a spill of any type or amount of hazardous waste or materials, immediate action would be taken by the construction contractor to contain and clean up the spill. The contractor would be responsible for the proper removal, transport, and disposal of all waste and associated clean up material; and cleanup, removal, transport, and disposal would be conducted according to all applicable Federal, state, and local regulations. With implementation of the procedures outlined above, any impacts associated with hazardous waste and materials due to construction of the Travis Terminal would be less than significant.

Operation

Operation of the Travis Terminal is expected to generate negligible quantities of hazardous waste; however, storage, transport, and disposal of hazardous waste would follow all applicable regulations, and impacts would be less than significant.

All potentially hazardous materials associated with operation would be stored in accordance with applicable hazardous and flammable storage regulations.

The Travis Terminal would be operated by a computerized SCADA system which would continuously gather data and make automatic operational adjustments to provide for safe system operations (refer to Section 2.3.2, *Pipeline Operations*). In addition, terminal facilities would be protected from corrosion by cathodic corrosion protection, and regular inspection and maintenance would occur as required by DOT *PHMSA* (49 CFR § 195) regulations. Operation of the Travis Terminal would be included in the SFPP and Travis AFB *ICPs* for emergency response activities, and emergency response would be coordinated through Travis AFB emergency responders (refer to Section 2.3.4, *Emergency Situations*). With implementation of the components and procedures outlined above, any impacts associated with hazardous waste and materials due to operation of the Travis Terminal would be less than significant.

<u>Fuel Storage, Distribution, and Containment</u>

Construction

Construction of the Travis Terminal would not impact existing fuel storage, distribution, and containment facilities at Travis AFB. Temporary increases in the procurement, storage, handling, and use of fuels and petroleum products due to construction activities would be conducted in accordance with all applicable regulations, and any impacts would be less than significant.

Operation

Operation of the Travis Terminal would substantially increase the JP-8 storage and distribution capacity at Travis AFB. Increased fuel storage capacity would be beneficial to operations at Travis AFB and would enhance the ability of base personnel to maintain and operate base-assigned and other aircraft. Secondary containment designed to hold over 100 percent of tank capacity would be installed around each individual tank at the Travis Terminal. The system would contain product within the footprint of each tank in the event of an accidental release, thereby reducing potential impacts to surrounding areas. In addition, Travis Terminal operations would be incorporated into the SFPP and Travis AFB ICPs for emergency response activities. Consequently, no significant impacts with regard to fuel storage, distribution, and containment would result.

4.4.1.2 Travis Junction

<u>Hazardous Waste and Materials</u>

Construction

Similar to the Travis Terminal, construction of the Travis Junction is expected to generate a negligible quantity of hazardous waste and result in the temporary storage of hazardous materials. However, storage, transport, and disposal of such wastes and materials would follow all applicable regulations, and less than significant impacts

would result. Any potential spills or releases would be contained and cleaned up immediately in accordance with all applicable regulations.

Operation

Operation of the Travis Junction is not expected to generate hazardous waste, and any hazardous materials associated with operations would be stored, transported, and disposed of in accordance with all applicable regulations. The junction would be operated by the same computerized SCADA system as the Travis Terminal, and regular inspection would occur as required by DOT *PHMSA* regulations. Junction operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Accordingly, any impacts would be insignificant.

<u>Fuel Storage, Distribution, and Containment</u>

Construction

Construction of the Travis Junction would not impact existing fuel storage, distribution, and containment facilities at Travis AFB, and any temporary increases in the procurement, storage, handling, and use of fuels and petroleum products due to construction activities would be insignificant.

Operation

Operation of the Travis Junction would allow for the transfer of JP-8 from SFPP's Concord-to-Sacramento Pipeline to the proposed Travis Pipeline, Travis Terminal, and existing Travis AFB *Bulk Fuels Receiving Facility*. Accordingly, junction operations would be a critical component to support beneficial impacts associated with increased fuel storage and distribution capacity at Travis AFB.

4.4.2 Alternative 1 – Proposed Action

4.4.2.1 Travis Pipeline

<u>Hazardous Waste and Materials</u>

Construction

Under the Proposed Action, construction of the Travis Pipeline is expected to generate a negligible quantity of hazardous waste and result in the temporary storage of hazardous materials. However, storage, transport, and disposal of such wastes and materials would follow all applicable regulations. Equipment requiring the use of hazardous materials (e.g., oils, lubricants, etc.) would be closely monitored for leakage, and no refueling or lubrication of equipment would occur within 250 feet of identified sensitive habitat areas.

Equipment and materials specifically associated with HDD, including the pilot drill head, drill rig, and reamers, would require minimal use of hazardous materials, and no significant impacts would result around entry and exit points or within excavated areas. Further, the pressurized drilling mud associated with HDD operations would not

contain any hazardous materials or substances. Consequently, impacts associated with construction of the Travis Pipeline under the Proposed Action would be expected to be less than significant.

Operation

Operation of the Travis Pipeline under the Proposed Action is not expected to generate hazardous waste, and all hazardous materials associated with operation would be stored, transported, and disposed of in accordance with applicable hazardous and flammable storage regulations. Pipeline operations would be conducted by the same computerized SCADA system as the Travis Terminal, and cathodic corrosion protection would be incorporated into the pipeline. In addition, regular inspection would occur as required by DOT *PHMSA* regulations. Operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Accordingly, impacts associated with operation of the Travis Pipeline under the Proposed Action would be expected to be less than significant.

<u>Fuel Storage, Distribution, and Containment</u>

Construction

Construction of the Travis Pipeline, including the 10-inch portion of the pipeline to tie into the existing Travis AFB *Bulk Fuels Receiving Facility*, is not expected to impact on-base fuel storage, distribution, and containment. Any temporary increases in the procurement, storage, handling, and use of fuels and petroleum products due to construction activities would result in less than significant impacts.

Operation

Operation of the Travis Pipeline would facilitate substantial increases in the JP-8 storage and distribution capacity at Travis AFB due to establishment of a connection between the Concord-to-Sacramento Pipeline and the existing on-base *Bulk Fuels Receiving Facility*. Increased fuel storage capacity would be beneficial to operations at Travis AFB and would enhance the ability of base personnel to maintain and operate base-assigned and other aircraft.

4.4.2.2 Mitigation

No significant impacts associated with hazardous materials and wastes, or fuel storage, distribution, and containment would be expected to result from the Proposed Action. Therefore, no mitigation would be required.

4.4.2.3 Cumulative Impacts

The Proposed Action would generate a negligible quantity of hazardous waste and require the use of a negligible quantity of hazardous materials, neither of which would cumulatively impact existing conditions at Travis AFB.

4.4.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.4.3.1 Travis Pipeline

Hazardous Waste and Materials

Construction

Similar to the Proposed Action, construction of the Travis Pipeline under Alternative 2 would result in a minor, temporary increase in hazardous materials and wastes. Storage, transport, and disposal of hazardous materials and waste would follow all applicable regulations, and equipment requiring the use of hazardous materials would be subject to the same monitoring and servicing procedures as the Proposed Action. Equipment utilized for slick-bore and conventional trenching would not require substantial use of hazardous materials, and no significant impacts would occur within or adjacent to excavated areas. Therefore, pipeline construction impacts under Alternative 2 would be the same as the Proposed Action, less than significant.

Operation

As with the Proposed Action, operation of the Travis Pipeline under Alternative 2 would not be expected to generate hazardous waste, and hazardous materials associated with operation would be stored, transported, and disposed of in accordance with applicable regulations. Operations under this alternative would incorporate the same detection and monitoring systems as the Proposed Action (i.e., SCADA system, cathodic protection, etc.), and regular inspection and maintenance pursuant to DOT *PHMSA* regulations would still occur. Operations would also still be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Consequently, pipeline operation impacts under Alternative 2 would be the same as the Proposed Action, less than significant.

Fuel Storage, Distribution, and Containment

Construction

With regard to on-base fuel storage, distribution, and containment, construction of the Travis Pipeline under Alternative 2 would be the same as the Proposed Action. Therefore, no significant impacts would result.

Operation

Similar to the Proposed Action, operation of the Travis Pipeline under Alternative 2 would facilitate substantial increases in the JP-8 storage and distribution capacity at Travis AFB, thereby resulting in beneficial impacts to operations at Travis AFB.

4.4.3.2 Mitigation

No significant impacts associated with hazardous materials and wastes, or fuel storage, distribution, and containment would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.4.3.3 Cumulative Impacts

As with the Proposed Action, Alternative 2 would generate a negligible quantity of hazardous waste and require the use of a negligible quantity of hazardous materials, neither of which would cumulatively impact existing conditions at Travis AFB.

4.4.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.4.4.1 Travis Pipeline

<u>Hazardous Waste and Materials</u>

Construction

Similar to the Proposed Action, construction of the Travis Pipeline under Alternative 3 would result in a minor, temporary increase in hazardous materials and wastes. Storage, transport, and disposal of hazardous materials and waste would follow all applicable regulations, and equipment requiring the use of hazardous materials would be subject to the same monitoring and servicing procedures as the Proposed Action. Establishment of an access road along the southern edge of the rail spur for construction activities would not increase impacts associated with hazardous waste and materials. Therefore, pipeline construction impacts under Alternative 3 would be the same as the Proposed Action, less than significant.

Operation

Similar to the Proposed Action, operation of the Travis Pipeline under Alternative 3 would not be expected to generate hazardous waste, and hazardous materials associated with operation would be stored, transported, and disposed of in accordance with applicable regulations. Because the pipeline would be installed aboveground under this alternative, a greater potential exists for accidental releases to impact surrounding areas. However, operations would incorporate the same detection and monitoring systems, and inspection and maintenance procedures as the Proposed Action, and any impacts specifically associated with aboveground installation would be negligible. Further, pipeline operations under this alternative would also still be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Consequently, pipeline operation impacts under Alternative 3 would be the same as the Proposed Action, less than significant.

Fuel Storage, Distribution, and Containment

Construction

With regard to on-base fuel storage, distribution, and containment, construction of the Travis Pipeline under Alternative 3 would be the same as the Proposed Action. Therefore, no significant impacts would result.

Operation

Similar to the Proposed Action, operation of the Travis Pipeline under Alternative 3 would facilitate substantial increases in the JP-8 storage and distribution capacity at Travis AFB, thereby resulting in beneficial impacts to operations at Travis AFB.

4.4.4.2 Mitigation

No significant impacts associated with hazardous materials and wastes, or fuel storage, distribution, and containment would be expected to result from Alternative 3. Therefore, no mitigation would be required.

4.4.4.2.1 Cumulative Impacts

As with the Proposed Action, Alternative 3 would generate a negligible quantity of hazardous waste and require the use of a negligible quantity of hazardous materials, neither of which would cumulatively impact existing conditions at Travis AFB.

4.4.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.4, *Hazardous Wastes, Materials, and Stored Fuels*, and beneficial impacts to fuel storage, distribution, and containment at Travis AFB would not occur.

4.5 WATER RESOURCES

An impact to water resources would be significant if implementation of a Proposed Action or project alternative would: 1) reduce water availability to or interfere with the supply of existing users; 2) create or contribute to the overdraft of groundwater basins or exceed the safe annual yield of water supply sources; 3) adversely affect water quality or endanger human health or the environment by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic characteristics; or, 5) violate established laws or regulations that have been adopted to protect or manage water resources. This section also provides a broad overview of potential impacts related to wetlands. Refer to Section 4.6, *Biological Resources*, for detailed information on potential impacts to biological resources associated with wetlands and other water resources. Further, because FEMA FIRMs do not indicate the presence of 100-year floodplains at Travis AFB, impacts related to floodplains and potential flooding were excluded from discussion to keep the analysis relevant and concise.

4.5.1.1 Area of Potential Effect (APE) and Notable Water Resources

Impacts analyses focus upon surface water and wetland areas located within or adjacent to the APE, as described in Section 3.5. Where relevant, analyses will specifically evaluate potential impacts to the following notable water resources, as shown on Figure 4-1:

- **Vernal Pool Complexes.** Multiple vernal pool complexes are located within or adjacent to the APE. Three large complexes are located on the north and south sides of the Travis Pipeline footprint; these complexes encroach into the APE at locations where drainage culverts exist beneath the existing rail spur, thereby creating a hydrologic connection between the north and south sides of the pipeline footprint. An additional vernal pool complex partially surrounded by a concrete berm is located north of the Travis Terminal footprint (USAF 2003a, 2008f).
- **Drainage Ditches.** Drainage ditches run the entire length of the Travis Pipeline footprint on the north and south sides of the rail spur. The ditches are seasonally inundated, but not for long enough periods of time to provide habitat for the vegetation common to vernal pools (USAF 2008f).
- **West Branch of Union Creek.** The channelized west branch of Union Creek runs north to south through the east part of the APE (USAF 2003a).

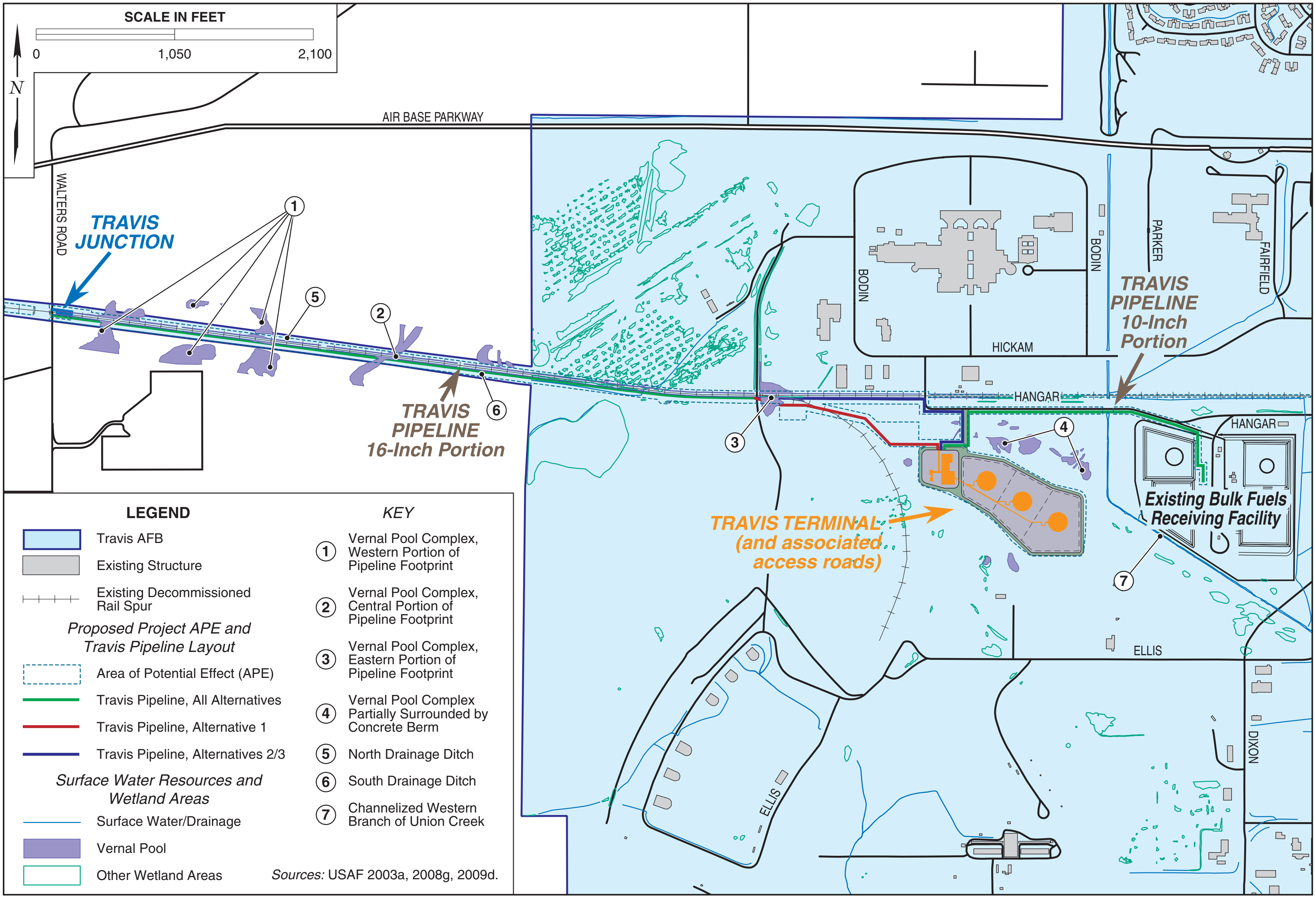
4.5.1.2 Preliminary Wetland Jurisdictional Determination

SFPP prepared a *Preliminary Determination and Delineation of Jurisdictional Waters* in February 2009 to assess potential for impacts to waters of the United States including wetlands in the APE and surrounding vicinity. The USACE reviewed the findings of the report, including a field review on 14 September 2009. The USACE completed a *Preliminary Jurisdictional Determination Form* (refer to *Appendix P*) on which a total of approximately 12.35 acres of jurisdictional waters were identified within the 180-acre APE vicinity. Of the identified waters, a total of approximately 11.27 acres were determined to be jurisdictional wetlands, while the remaining approximately 1.08 acres were determined to be non-wetland jurisdictional waters (USACE 2009b).

As discussed below, any activities under the Proposed Action or project alternatives that would modify jurisdictional waters (including wetlands) would be subject to conditions set forth under applicable USACE permits.

4.5.1.3 Biological Opinion (BO)

The USFWS issued a *BO* in October 2009 on the potential affects of the Proposed Action on biological resources in the APE (USFWS 2009). The BO included information on conservation and minimization measures designed to reduce potential impacts to special-status species resulting from temporary or permanent disturbance to water resources. Where relevant, information in the BO is presented throughout the discussions below. Refer to *Appendix O* for the complete BO.



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Notable Surface Water Resources and Wetlands in the Vicinity of the Proposed Project Area of Potential Effect (APE)

FIGURE 4-1

4.5.2 Components Common to All Proposed Alternatives

4.5.2.1 Travis Terminal

<u>Construction</u>

Surface Water

The Travis Terminal would be located in the vicinity of the west branch of Union Creek (refer to Figure 4-1). Construction of the terminal would require extensive soil excavation, storage, and backfill which could potentially result in increased erosion and sedimentation that could potentially enter the waters of the creek. During construction, soil stabilization and erosion control BMPs (e.g., installation of silt fencing, etc.) would be incorporated to limit potential degradation of water quality in adjacent surface waters due to runoff. Implementation of BMPs would reduce construction-related impacts to less than significant levels.

Groundwater

Average depth to groundwater in the Travis Terminal footprint varies from 10 to 15.5 feet bgs in topographically level areas to 24 to 27 feet bgs in upward sloping areas (USAF 2009e). While excavation would be largely limited to no greater than 8 to 10 feet bgs, due to the extensive nature of the excavation which would occur in the terminal footprint, the potential exists to encounter groundwater. Should groundwater be encountered, discharges would occur in compliance with Travis AFB and applicable permit requirements in a manner that would not impact surface waters.

Prior to construction of the Travis Terminal, the three existing groundwater monitoring wells located in the terminal footprint would be decommissioned in accordance with established laws, regulations, and guidelines. Potential impacts to groundwater associated with decommissioning of the wells would be less than significant (refer to Section 4.12, *Environmental Management*).

Wetlands

No vernal pools or other wetland areas would be located in the Travis Terminal footprint; however, a vernal pool complex partially surrounded by a concrete berm is located north of the terminal footprint (refer to Figure 4-1). Due to the presence of the concrete berm, impacts to the vernal pool complex are expected to be minimal. Incorporation of the soil stabilization and erosion control BMPs above would further reduce potential degradation of water quality in this vernal pool complex. Therefore, construction-related impacts to wetlands are expected to be less than significant.

Operation

Surface Water

Operation of the Travis Terminal would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), and regular inspection and maintenance would occur pursuant to DOT *PHMSA* regulations. Terminal operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Secondary containment designed to hold over 100 percent of tank capacity would be installed around each individual terminal tank. The system would contain product within the footprint of each tank in the event of an accidental release, thereby reducing the likelihood of surface water contamination. With incorporation of these systems and procedures, operation-related impacts to adjacent surface waters (i.e., west branch of Union Creek) would be less than significant.

Groundwater

Average depth to groundwater in the Travis Terminal footprint varies from 10 to 27 feet bgs (USAF 2009e). The use of detection and monitoring systems and regular inspection and maintenance procedures would reduce the likelihood of an accidental release that could potentially impact groundwater. In addition, secondary containment areas around each individual tank designed to hold over 100 percent of tank capacity would contain product within the footprint of each tank, thereby further reducing the likelihood of groundwater contamination. Consequently, operation-related impacts to groundwater are expected to be less than significant.

Wetlands

Operation of the Travis Terminal is not expected to impact the vernal pool complex located north of the terminal footprint (refer to Figure 4-1). Detection and monitoring systems, regular inspection and maintenance procedures, and the installation of secondary containment areas around each individual tank would reduce the potential for accidental releases which could impact wetland areas. Accordingly, operation-related impacts to wetlands are expected to be less than significant.

4.5.2.2 Travis Junction

Construction

Surface Water

The drainage ditches along the north and south sides of the rail spur would be located within temporary and permanent disturbance areas associated with installation of the Travis Junction. A total of approximately 0.034 acre of surface waters in the drainage ditch would be temporarily disturbed due to construction activities, including approximately 0.017 acre of the north ditch and 0.017 acre of the south ditch. However, restricting construction activities to the dry season (i.e., 16 April to 14 October) and incorporating soil stabilization and erosion control BMPs would reduce potential impacts to less than significant levels.

The drainage ditch along the south side of the rail spur would be located within the 0.17-acre permanent Travis Junction footprint. A 120-foot segment of the south drainage ditch, totaling approximately 0.017 acre, would be permanently disturbed due to installation of the junction. However, a culvert would be installed under the rail spur to divert stormwater drainage to the north ditch, and no significant impacts to nearby surface water resources would result.

All activities associated with modification of the drainage ditches would be subject to conditions set forth under a Section 404 Permit from the USACE and Section 401 Certification from the RWQCB. All temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities. To offset potential indirect impacts to potential habitat for Contra Costa goldfields due to the loss of approximately 0.017 acre of surface waters, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County.

Groundwater

Depth to groundwater near the Travis Junction footprint is approximately 7.5 feet bgs (USAF 2009e). Since construction of the Travis Junction would require minimal soil excavation, storage, and backfill, the likelihood of encountering groundwater would be minimal. However, should groundwater be encountered during junction construction, discharges would occur in compliance with Travis AFB and applicable permit requirements in a manner that would not impact surface waters.

Wetlands

The USFWS *BO* noted that the loss of approximately 0.017 acre of surface waters due to installation of the Travis Junction would indirectly impact potential wetland habitat for Contra Costa goldfields (USFWS 2009). To offset potential indirect impacts to potential habitat for Contra Costa goldfields due to the loss of approximately 0.017 acre of surface waters, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County. All temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities.

<u>Operation</u>

Surface Water

Operation of the Travis Junction would incorporate the same detection and monitoring systems and regular inspection and maintenance procedures as the Travis Terminal, and operations would be incorporated into the SFPP and Travis AFB *ICPs*. Further, any repairs of aboveground equipment would occur in the junction site, and none would potentially impact nearby surface waters. Therefore, operation-related impacts would be less than significant.

Groundwater

Because Travis Junction operations would incorporate detection and monitoring systems, and regular inspection and maintenance procedures, and repairs would be restricted to the junction site, no significant impacts to groundwater would be expected to result.

Wetlands

The USFWS *BO* noted that the loss of approximately 0.017 acre of surface waters due to installation of the Travis Junction would indirectly impact potential wetland habitat for Contra Costa goldfields (USFWS 2009). To offset potential indirect impacts to potential habitat for Contra Costa goldfields due to the loss of approximately 0.017 acre of surface waters, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County. All temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities. With incorporation of detection and monitoring systems, regular inspection and maintenance procedures, and restricting repairs to the junction site, no additional impacts to wetlands would result.

4.5.3 Alternative 1 – Proposed Action

4.5.3.1 Travis Pipeline

<u>Construction</u>

Surface Water

Under the Proposed Action, the approximately 0.5-mile 10-inch portion of the Travis Pipeline would be installed primarily by the use of conventional trenching (Figure 4-2). No surface waters would be located within the conventional trenching construction footprint. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. An approximately 75-foot segment of the 10-inch pipeline would cross the channelized west branch of Union Creek. This pipeline segment would be installed by the use of slick-bore beneath the channel or by attachment to the existing bridge crossing the channel. All staging and access related to installation of this pipeline segment would occur via adjacent conventionally trenched areas, and no disturbance to Union Creek or other surface waters would occur.

Under the Proposed Action, the approximately 1.4-mile 16-inch portion of the Travis Pipeline would be installed along the southern edge of the existing rail spur primarily by using HDD, and by conventional trenching in limited segments (Figure 4-2). HDD would be used to install approximately 1.1 miles of the pipeline, and no disturbance to surface waters would occur along this pipeline segment. The use of HDD would require establishment of entry and exit point ROW areas to facilitate pipeline

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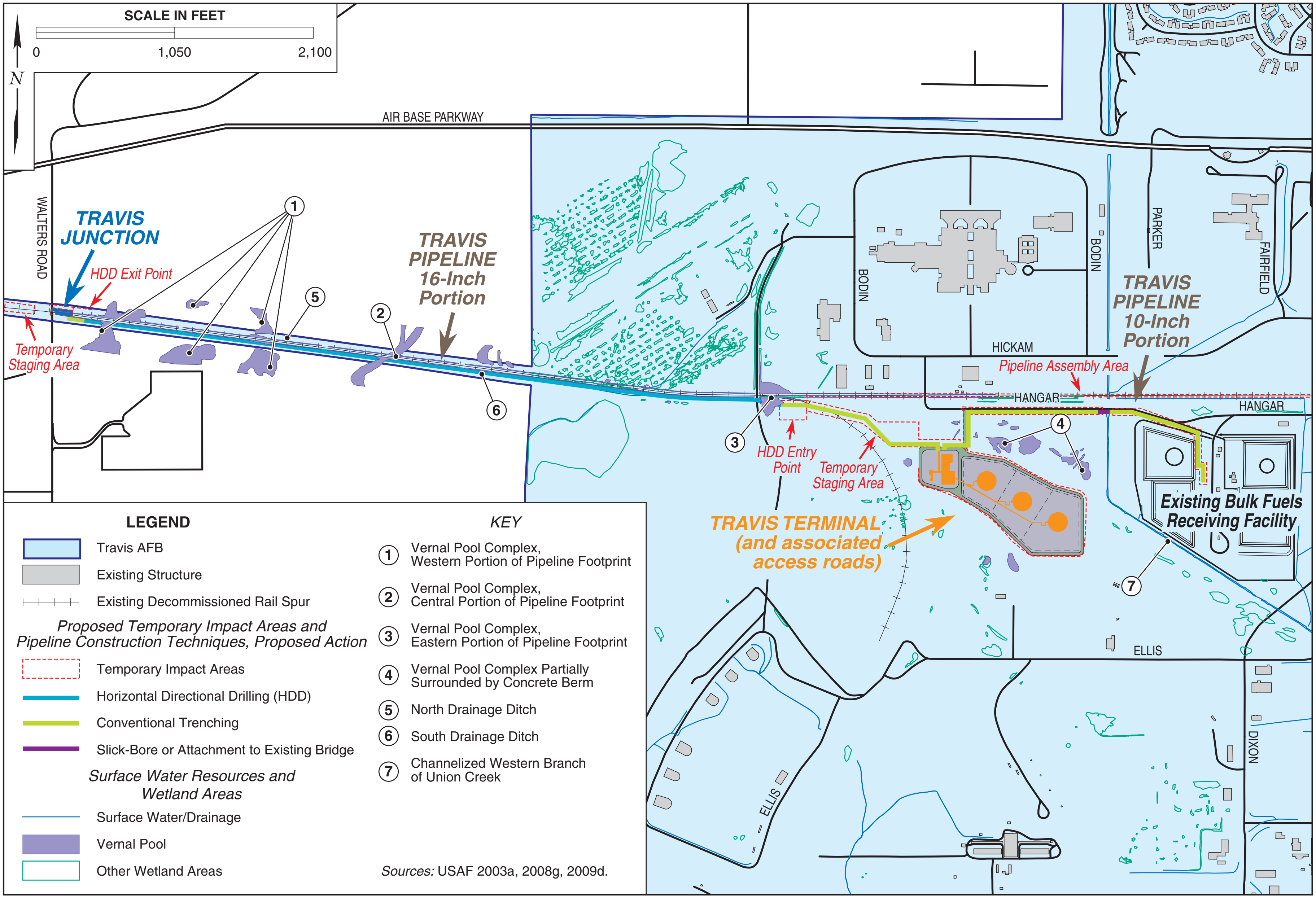

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Travis Pipeline, Construction Techniques and Temporary Impact Areas under the Proposed Action and Notable Surface Water Resources and Wetlands

FIGURE 4-2

installation. No surface waters would be located in the entry point ROW. A total of approximately 0.038 acre of surface waters would be located in the exit point ROW, including approximately 0.021 acre of the north drainage ditch and 0.017 acre of the south drainage ditch. Temporary disturbance would occur to these surface waters due to construction activities; however, restricting activities to the dry season and incorporating soil stabilization and erosion control BMPs would reduce potential impacts to less than significant levels. Further, all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

Conventional trenching would be used to install the remaining approximately 0.3 mile of the 16-inch portion of the Travis Pipeline. No surface waters would be located within conventional trenching excavation or ROW areas along this pipeline segment, and no significant impacts to surface waters would be anticipated to result.

Groundwater

Average depth to groundwater along the Travis Pipeline footprint varies from 5 to 7.5 feet bgs (USAF 2009e). Because the pipeline would be installed at up to 60 inches bgs, the potential exists to encounter groundwater. Should groundwater be encountered during pipeline construction, discharges would occur in compliance with Travis AFB and applicable permit requirements in a manner that would not impact surface waters.

Wetlands

Under the Proposed Action, construction of the Travis Pipeline would not directly disturb any vernal pools or other wetland areas (refer to Figure 4-2). Because construction activities would be restricted to the dry season, there would be no disturbance to hydrologically-connected wetland areas, and no significant impacts to wetlands would result.

<u>Operation</u>

Surface Water

Under the Proposed Action, operation of the Travis Pipeline would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), and regular inspection and maintenance would occur pursuant to DOT *PHMSA* regulations. Pipeline operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. In the event of maintenance or emergency repairs requiring excavation, potentially disturbed areas would be evaluated by a qualified biologist and potential impacts to surface waters would be assessed. If implementation of conservation measures in potentially disturbed areas would not sufficiently reduce potential impacts to surface waters, excavation activities would undergo separate Section 7 consultation with the USFWS and incorporate separate mitigation for unavoidable impacts. With incorporation of these systems and procedures, operational impacts to surface waters would be less than significant.

Groundwater

Under the Proposed Action, operation of the Travis Pipeline would incorporate detection and monitoring systems, and regular inspection and maintenance would occur pursuant to DOT *PHMSA* regulations. Incorporation of maintenance and monitoring procedures would reduce the likelihood of an accidental release that could potentially impact groundwater and accordingly reduce impacts to less than significant levels.

Wetlands

Once operational, access to the Travis Pipeline under the Proposed Action would occur from the raised railbed of the existing decommissioned rail spur. To the extent feasible, pipeline maintenance activities would be conducted only during the dry season, thereby reducing potential impacts to wetland areas located in the vicinity of the pipeline footprint. Incorporation of detection and monitoring systems would further reduce potential impacts. In the event of maintenance or emergency repairs requiring excavation, potentially disturbed areas would be evaluated by a qualified biologist and potential impacts to wetland areas would be assessed. If implementation of conservation measures in potentially disturbed areas would not sufficiently reduce potential impacts to wetland areas, excavation activities would undergo separate Section 7 consultation with the USFWS and incorporate separate mitigation for unavoidable impacts. With incorporation of these systems and procedures, operational impacts to wetland areas would be expected to be less than significant.

4.5.3.2 Mitigation

Impacts to water resources due to implementation of the Proposed Action would be mostly limited to temporary disturbance to the drainage ditches along the north and south sides of the rail spur during construction of the Travis Junction and Travis Pipeline. Construction of the Travis Junction would permanently disturb a 120-foot segment of the drainage ditch along the southern side of the rail spur totaling approximately 0.017 acre. However, a culvert would be installed under the rail spur to divert stormwater drainage to the north ditch.

All activities associated with modification of the drainage ditches would be subject to conditions set forth under a Section 404 Permit from the USACE and Section 401 Certification from the RWQCB. All temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities. To offset the loss of approximately 0.017 acre of surface waters due to installation of the Travis Junction, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County. No additional mitigation would be required.

4.5.3.3 Cumulative Impacts

Construction of the Proposed Action would comply with applicable regulatory requirements and would not be expected to cumulatively impact water resources. Once operational, activities associated with the Proposed Action would be managed in accordance with *PHMSA* requirements and would not be expected to cumulatively impact water resources. Therefore, no cumulative impacts to surface water, groundwater, or wetlands would be expected as a result of the Proposed Action.

4.5.4 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.5.4.1 Travis Pipeline

<u>Construction</u>

Surface Water

Under Alternative 2, construction of the 10-inch portion of the Travis Pipeline would be the same as the Proposed Action. Accordingly, impacts to surface waters along this pipeline segment would be the same as the Proposed Action, less than significant.

Under Alternative 2, the 16-inch portion of the Travis Pipeline would be installed along the southern edge of the rail spur using a combination of slick-bore and conventional trenching. The use of slick-bore would occur at four locations along the pipeline footprint where drainage culverts beneath the rail spur create a hydrologic connection between the north and south drainage ditches (Figure 4-3). The combined length of all four segments would total approximately 0.2 mile. All staging and access related to slick-bore would occur via adjacent conventionally trenched areas, and no direct impacts to these surface waters would occur.

Conventional trenching would be used to install the remaining approximately 1.2 miles of the 16-inch portion of the Travis Pipeline under Alternative 2 (Figure 4-3). During excavation, the top 9 inches of excavated soils would be stored separately and, upon completion of pipeline installation, returned and restored to pre-construction contours to limit the potential for changes in surface hydrology. In addition, soil stabilization and erosion control BMPs would be implemented during construction, and activities would be restricted to the dry season. Accordingly, impacts to this segment of the south drainage ditch would be less than significant.

Under Alternative 2, conventional trenching would result in temporary disturbance to approximately 0.33 acre of the south drainage ditch due to the temporarily stockpiling of excavated soils within the ditch. However, restricting activities to the dry season and incorporating soil stabilization and erosion control BMPs would reduce potential impacts to these surface waters. Separately storing the top 9 inches of excavated soils and, upon completion of pipeline installation, returning and restoring soils to pre-construction condition would also limit the potential for changes in surface

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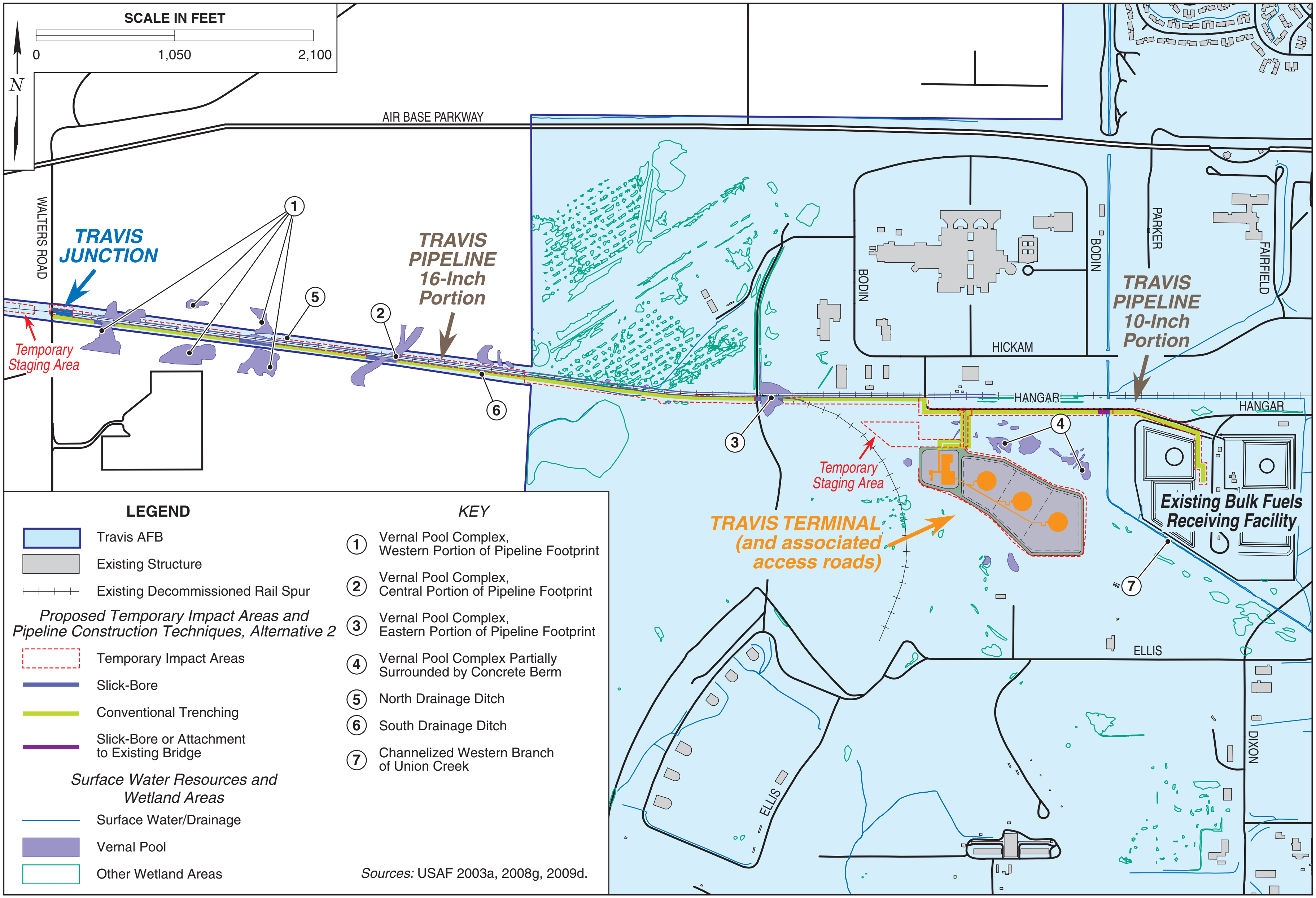
This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



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Travis Pipeline, Construction Techniques and Temporary Impact Areas under Alternative 2 and Notable Surface Water Resources and Wetlands

FIGURE 4-3

hydrology to these surface waters. Further, all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. With incorporation of BMPs and other measures, less than significant impacts to surface waters would result.

Groundwater

As with the Proposed Action, the potential exists to encounter groundwater during installation of the Travis Pipeline under Alternative 2. Should groundwater be encountered, discharges would occur in compliance with Travis AFB and applicable permit requirements in a manner that would not impact surface waters.

Wetlands

Under Alternative 2, slick-bore would be used to avoid direct disturbance to vernal pool complexes at four locations along the Travis Pipeline footprint (refer to Figure 4-3). As a result, no direct disturbance to vernal pools or other wetland areas would occur. Because construction activities would be restricted to the dry season, the temporary disturbance of approximately 0.33 acre of surface waters is not anticipated to impact hydrologically-connected wetland areas. Therefore, any impacts to wetland areas are expected to be less than significant.

<u>Operation</u>

Surface Water

Operation of the Travis Pipeline under Alternative 2 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. Accordingly, operational impacts to surface waters under Alternative 2 would be the same as the Proposed Action, less than significant.

Groundwater

Operation of the Travis Pipeline under Alternative 2 would be the same as the Proposed Action; consequently, less than significant impacts to groundwater would result.

Wetlands

Operation of the Travis Pipeline under Alternative 2 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. Therefore, operational impacts to wetland areas under Alternative 2 would be the same as the Proposed Action, less than significant.

4.5.4.2 Mitigation

Impacts to water resources due to implementation of Alternative 2 would be limited to temporary disturbance to the drainage ditches along the north and south sides of the rail spur during construction of the Travis Junction and Travis Pipeline. Construction of the Travis Junction would permanently disturb a 120-foot segment of the drainage ditch along the southern side of the rail spur totaling approximately 0.017 acre. However, a culvert would be installed under the rail spur to divert stormwater drainage to the north ditch.

All activities associated with modification of the drainage ditches would be subject to conditions set forth under a Section 404 Permit from the USACE and Section 401 Certification from the RWQCB. All temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities. To offset the loss of approximately 0.017 acre of surface waters due to installation of the Travis Junction, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County. No additional mitigation would be required.

4.5.4.3 Cumulative Impacts

Construction of Alternative 2 would comply with applicable regulatory requirements and is not expected to cumulatively impact water resources. Once operational, activities associated with Alternative 2 would be managed in accordance with *PHMSA* requirements and are not expected to cumulatively impact water resources. Therefore, no cumulative impacts to surface water, groundwater, or wetlands are expected as a result of Alternative 2.

4.5.5 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

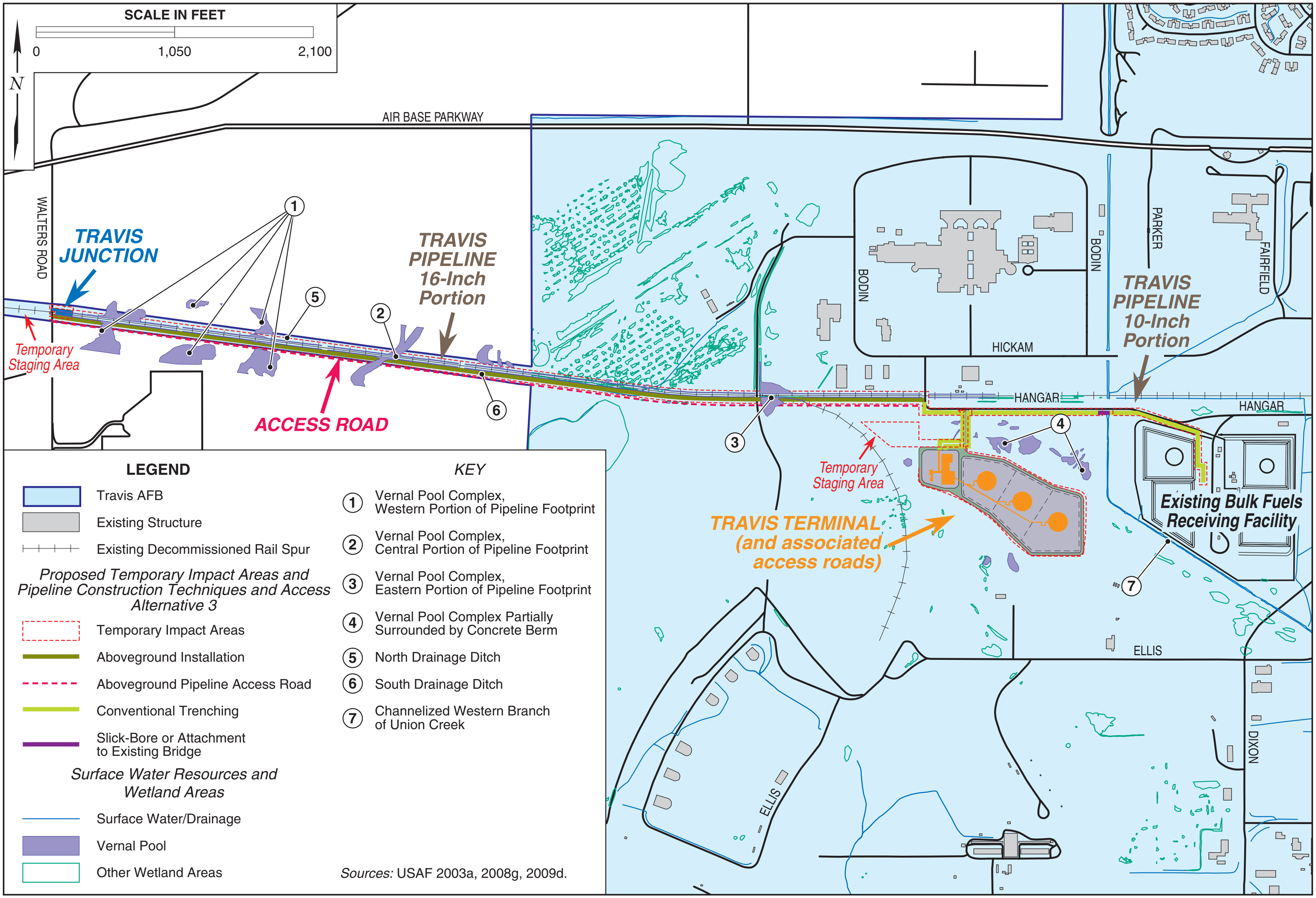
4.5.5.1 Travis Pipeline

<u>Construction</u>

Surface Water

Under Alternative 3, construction of the 10-inch portion of the Travis Pipeline would be the same as the Proposed Action. Accordingly, impacts to surface waters along this pipeline segment would be the same as the Proposed Action, less than significant.

Under Alternative 3, approximately 1.2 miles of the 16-inch portion of the Travis Pipeline would be installed aboveground in the footprint of the existing decommissioned rail spur (Figure 4-4). Construction of this pipeline segment would include the establishment of a temporary work area adjacent to the pipeline footprint which would overlay the drainage ditch along the south side of the rail spur. Activities in the work area would temporarily disturb approximately 1.71 acres of surface waters,



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Travis Pipeline, Construction Techniques, Temporary Impact Areas, and Access Road under Alternative 3 and Notable Surface Water Resources and Wetlands

FIGURE 4-4

including 0.97 acre of the north ditch and 0.74 acre of the south ditch. However, restricting activities to the dry season and restoring all temporary disturbance areas to pre-construction condition within one year of initial disturbance would reduce potential impacts in the work area to less than significant levels.

Construction of the aboveground portion of the Travis Pipeline would require the establishment of an access road adjacent to the pipeline footprint (refer to Figure 4-4). In order to partially avoid significant adverse impacts to surface waters, the road would be constructed along the south side of the south drainage ditch. However, a total of approximately 0.28 acre of surface waters would be located in the roadway footprint in areas where hydrologic connections exists between the north and south drainage ditches. To maintain existing hydrologic connections, culverts would be constructed under the road, and existing surface hydrology in the vicinity of the roadway footprint would be maintained as feasible. However, construction of the access road is still anticipated to result in significant adverse impacts to surface waters along the Travis Pipeline footprint. Upon completion of construction activities, the road would be maintained for maintenance access, as described below.

Under Alternative 3, conventional trenching would be used to install the remaining approximately 0.2 mile of the 16-inch portion of the Travis Pipeline (refer to Figure 4-4). No surface waters would be located within excavation or ROW areas along this pipeline segment, and no significant impacts to surface waters would result.

Groundwater

Under Alternative 3, installation of approximately 1.2 miles of the Travis Pipeline aboveground would reduce the likelihood of encountering groundwater during pipeline installation. However, as with the Proposed Action, the potential exists under Alternative 3 to encounter groundwater along the segments of the pipeline that would be installed by conventional trenching or slick-bore. Should groundwater be encountered, discharges would occur in compliance with Travis AFB and applicable permit requirements in a manner that would not impact surface waters.

Wetlands

Under Alternative 3, no vernal pools or other wetlands would be directly located in the Travis Pipeline footprint. However, establishment of the temporary work area adjacent to the aboveground portion of the pipeline would temporarily disturb approximately 1.71 acres of wetland areas, including 0.97 acre of the north ditch and 0.74 acre of the south ditch (refer to Figure 4-4). Restricting construction activities to the dry season and restoring all temporary disturbance areas to pre-construction condition upon completion of pipeline installation would reduce potential impacts to vernal pools and other wetland areas in the work area to less than significant levels.

Establishment of the pipeline access road along the south side of the south drainage ditch, instead of within the ditch, would partially avoid significant adverse impacts to

vernal pools and other wetland areas in the ditch (refer to Figure 4-4). However, a total of approximately 0.28 acre of wetland areas located in the roadway footprint would be permanently lost due to roadway construction. Accordingly, impacts to vernal pools and other wetland areas under Alternative 3 would be significant and adverse.

<u>Operation</u>

Surface Water

Operation of the Travis Pipeline under Alternative 3 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. However, establishment of the pipeline maintenance access road along the south side of the south drainage ditch could potentially result in permanent changes to surface hydrology in areas where the roadway footprint would cross existing hydrologic connections. Accordingly, impacts to surface waters under Alternative 3 would be significant and adverse.

Groundwater

Under Alternative 3, installation of approximately 1.2 miles of the Travis Pipeline aboveground would reduce the likelihood of excavation during pipeline maintenance and emergency repairs, thereby reducing the likelihood of encountering groundwater. Similar to the Proposed Action, pipeline operations under Alternative 3 would incorporate maintenance and monitoring procedures which would reduce the likelihood of an accidental release that could potentially impact groundwater. Accordingly, impacts to groundwater under Alternative 3 are expected to be less than significant.

Wetlands

Operation of the Travis Pipeline under Alternative 3 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. However, establishment of the pipeline maintenance access road along the south side of the south drainage ditch would result in the loss of approximately 0.28 acre of vernal pools and other wetland areas located in the roadway footprint. Additional wetland areas may also be indirectly impacted due to potential changes in surface hydrology resulting from establishment of the access road. Consequently, impacts to vernal pools and other wetland areas under Alternative 3 would be significant and adverse.

4.5.5.2 Mitigation

Implementation of Alternative 3 would have significant adverse impacts to water resources due to installation of the access road for construction and maintenance of the

aboveground portion of the Travis Pipeline. Establishment of the access road would result in the loss of approximately 0.28 acres of vernal pools and other wetland areas. The use of culverts and other surface water flow diversion techniques would be incorporated into the design of the access road to minimize impacts to wetland areas located within and adjacent to the roadway footprint. In addition, construction of the Travis Junction would permanently disturb a 120-foot segment of the drainage ditch along the southern side of the rail spur totaling approximately 0.017 acre. However, a culvert would be installed under the rail spur to divert stormwater drainage to the north ditch. All activities associated with modification of jurisdictional waters would be subject to conditions set forth under applicable USACE permits. The USAF would also purchase conservation credits at a USFWS-approved mitigation bank in Solano County to offset potential impacts from the loss of wetland areas and other surface waters due to establishment of the access road and installation of the junction. Further, all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. Refer to Section 4.6, *Biological Resources*, for a discussion of potential impacts to sensitive species and required mitigation due to Alternative 3.

4.5.5.3 Cumulative Impacts

Significant adverse impacts to water resources would result from Alternative 3. However, construction of Alternative 3 would comply with applicable regulatory requirements and is not expected to cumulatively impact water resources. Once operational, activities associated with this alternative would be managed in accordance with *PHMSA* requirements and are not expected to cumulatively impact water resources. Therefore, no cumulative impacts to surface water, groundwater, or wetlands are expected as a result of Alternative 3.

4.5.6 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.5, *Water Resources*.

4.6 BIOLOGICAL RESOURCES

Significance criteria for biological resources impacts are based on 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; 2) the proportion of the resource that would be affected relative to its occurrence in the region; 3) the sensitivity of the resource to proposed activities; and, 4) the duration of ecological ramifications. Impacts to biological resources would be considered significant if implementation of a Proposed Action or project alternative would impact a threatened or endangered species, greatly diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere with wildlife movement or reproductive behavior, and/or result in an infusion of exotic plant or animal species. This section also provides a discussion of potential impacts to

biological resources associated with wetland areas. Refer to Section 4.5, *Water Resources*, for a comprehensive discussion of potential impacts to wetland areas.

4.6.1 Area of Potential Effect (APE) and Notable Habitat Areas

Impacts analyses focus upon biological resources identified within or adjacent to the APE, as described in Section 3.6. Where relevant, analyses will specifically evaluate potential impacts to the following notable habitat areas, as shown on Figure 4-5:

- **Vernal Pool Complexes.** Three large complexes are located on the north and south sides of the Travis Pipeline footprint; these complexes encroach into the APE at locations where drainage culverts exist beneath the existing rail spur and create a hydrologic connection between the north and south sides of the pipeline footprint. An additional vernal pool complex partially surrounded by a concrete berm is located north of the Travis Terminal footprint (USAF 2003a, 2008f)**.** These vernal pools are known to provide habitat for **Contra Costa goldfields** and adjacent vernal pools have historical records of **vernal pool fairy shrimp**.

4.6.1.1 Special-Status Species Assessed in the Area of Potential Effect (APE)

Based on habitat assessments (USAF 2008f, 2009g) and rare plant surveys (USAF 2008g) conducted in 2008 and 2009, and a records search of the CNDDB (CNDDB 2008), one special-status plant species—Contra Costa goldfields—is known to occur in the APE. The special-status invertebrate species vernal pool fairy shrimp has historically been detected near the APE. The APE may also provide potentially suitable habitat for Conservancy fairy shrimp and vernal pool tadpole shrimp (USAF 2008f). Potentially suitable vernal pool breeding habitat and upland aestivation habitat for the California tiger salamander is likely absent from the APE (USAF 2009g). Therefore, impacts related to this species were excluded from discussion to keep analysis concise. Table 4-9 presents a summary of the special-status species assessed in the APE.

Table 4-9 Special-Status Species Assessed in the Area of Potential Effect (APE)

Common Name	Scientific Name	ESA Listing	Habitat Preference
Plants			
Contra Costa goldfields	*Lasthenia conjugens*	Endangered	Drying borders of vernal pools and seasonally wet grasslands.
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	Grasslands, temporary ponds, and open oak woodlands.
Invertebrates			
Conservancy fairy shrimp	*Branchinecta conservatio*	Endangered	Large playa-type vernal pools.
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	Vernal pools and temporary aquatic habitats.
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	Vernal pools and temporary aquatic habitats.

Source: USAF 2003a.

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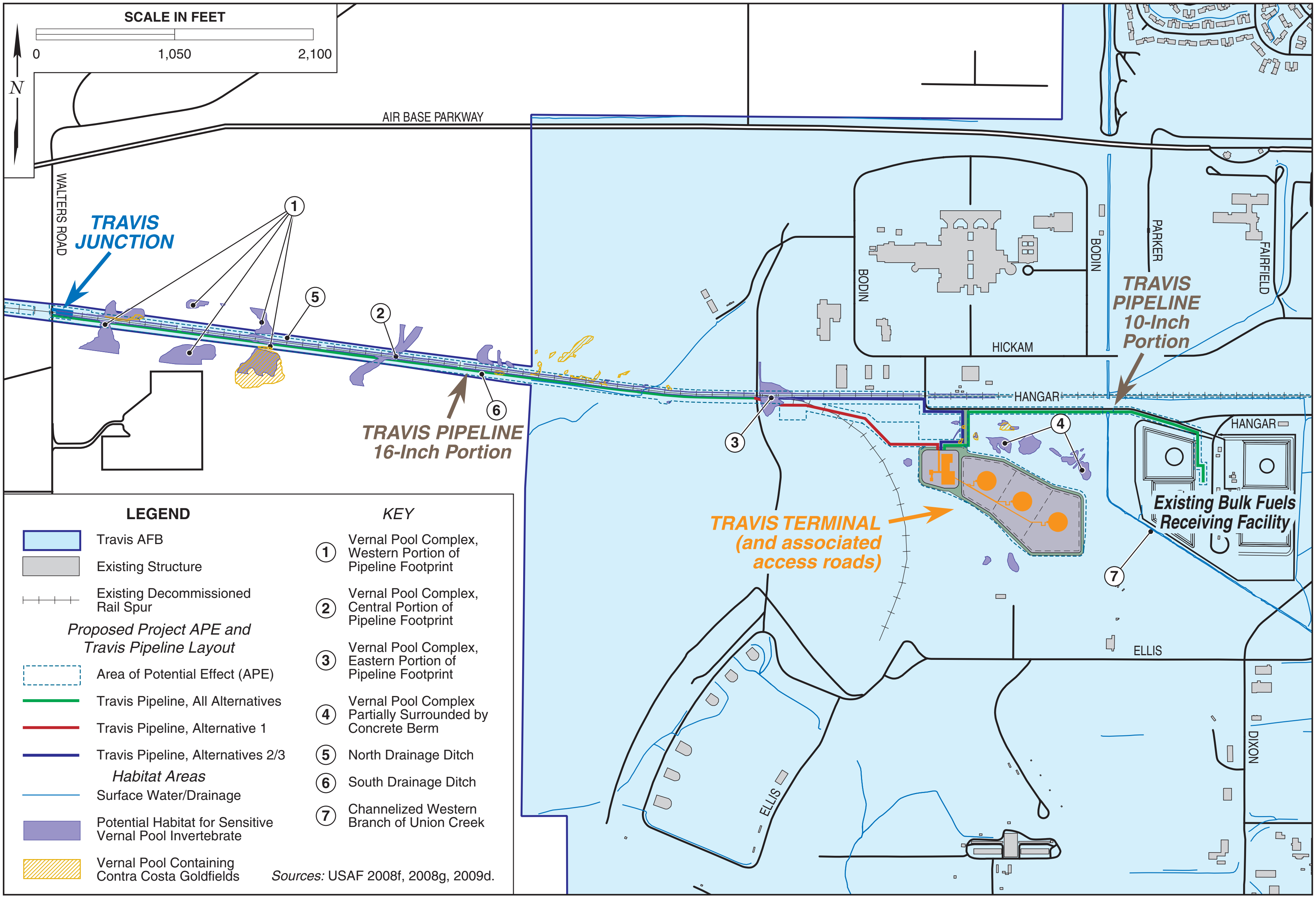

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Notable Habitat Areas in the Vicinity of the Proposed Project Area of Potential Effect (APE)

FIGURE 4-5

4.6.1.2 Mitigation for Potential Impacts

In the event that activities under the Proposed Action or project alternatives would permanently impact habitat areas containing or potentially containing special-status species, the USAF would purchase conservation credits at a USFWS-approved mitigation bank based upon size of habitat area impacted.

4.6.1.3 Biological Assessment (BA)

A *BA* was prepared in 2009 to assess biological resources in the APE (USAF 2009d). Included in the BA were discussions of habitat assessments (USAF 2008f, 2009g) and rare plant surveys (USAF 2008g) conducted in the APE, special-status species known or potentially occurring in the APE, and a preliminary assessment of potential impacts from the Proposed Action and project alternatives (USAF 2009d). Information in the BA is presented throughout the discussions below. Refer to *Appendix N* for the complete BA.

4.6.1.4 Biological Opinion (BO)

The USFWS issued a *BO* in October 2009 on the potential affects of the Proposed Action on biological resources in the APE, with an emphasis on the special-status plant species Contra Costa goldfields (USFWS 2009). The BO also recommended conservation and minimization measures to address potential impacts to Contra Costa goldfields, as well as general impacts to biological resources. The recommended measures in the BO would be applied as feasible under the Proposed Action and project alternatives during project construction and operation. Where relevant, information in the BO is presented throughout the discussions below. Refer to *Appendix O* for the complete BO.

4.6.2 Components Common to All Proposed Alternatives

4.6.2.1 Travis Terminal

<u>Construction</u>

Construction of the Travis Terminal would disturb approximately 14.06 acres, including the approximately 13.34-acre permanent terminal footprint and additional temporary disturbance areas totaling approximately 0.72 acre. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance.

Vegetation

The Travis Terminal construction footprint would be located within a previously-disturbed vegetative habitat dominated by early successional/ruderal plant vegetation. The area does not consist of a unique or ecologically sensitive habitat; therefore, potential impacts to vegetation would be less than significant. A vernal pool complex partially surrounded by a concrete berm is located north of the terminal footprint (refer to Figure 4-5). However, due to the presence of the concrete berm, impacts to native vegetation communities in the vernal pool complex would be minimal.

Wildlife

The Travis Terminal construction footprint would be located within a previously-disturbed habitat that is generally not supportive of ecologically sensitive or unique wildlife species. However, the area may support nesting raptors and other migratory birds, including the burrowing owl and loggerhead shrike. Standard Travis AFB avoidance measures would be implemented to address potential impacts to the burrowing owl. The use of pre-construction surveys, nest removal prior to initiation of breeding activities, and biological monitoring to avoid disruption of normal nesting behaviors during terminal construction would reduce potential impacts to other nesting birds, including raptors, to less than significant levels.

Special-Status Species

The Travis Terminal construction footprint would be located within a heavily disturbed area currently used for heavy equipment training that does not contain potentially suitable habitat for special-status species (USAF 2008f, 2008g, 2009g). Accordingly, no significant impacts to special-status species would be expected in the terminal footprint.

The vernal pool complex located north of the Travis Terminal contains populations of Contra Costa goldfields and may provide potentially suitable habitat for special-status invertebrate species (refer to Figure 4-5). However, the presence of the concrete berm between the vernal pool complex and terminal footprint would reduce potential impacts to special-status species and potentially suitable special-status species habitat in the complex to less than significant levels. Incorporation of the soil stabilization and erosion control BMPs during terminal construction would further reduce potential impacts to special-status species and potentially suitable habitat areas in the vernal pool complex.

<u>Operation</u>

Vegetation

Operation of the Travis Terminal would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), and regular inspection and maintenance would occur pursuant to DOT *PHMSA* regulations. Terminal operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Secondary containment designed to hold over 100 percent of tank capacity would be installed around each individual terminal tank, thereby reducing the likelihood of accidental releases impacting adjacent vegetation. With incorporation of these systems and procedures, operational impacts to vegetation would be less than significant.

Wildlife

The incorporation of detection and monitoring systems and regular inspection and maintenance procedures into Travis Terminal operations, and construction of secondary containment areas around each tank would reduce operational impacts to wildlife to less than significant levels.

Special-Status Species

Operation of the Travis Terminal would be restricted to the previously-disturbed footprint of the terminal, and no maintenance activities would occur in nearby areas containing special-status species and potentially suitable special-status species habitat (e.g., the vernal pool complex north of the terminal footprint). In the event of an accidental release, secondary containment areas around each tank would hold product within the footprint of each tank and reduce the likelihood of potential impacts to nearby areas. The incorporation of detection and monitoring systems and regular inspection and maintenance procedures into terminal operations would further reduce potential impacts. Accordingly, operational impacts to special-status species and potentially suitable habitat areas would be less than significant.

4.6.2.2 Travis Junction

<u>Construction</u>

Construction of the Travis Junction would disturb a total of approximately 0.29 acre. The approximately 0.17-acre permanent junction footprint would include approximately 0.017 acre of surface waters. Additional temporary disturbance areas would total approximately 0.12 acre and would include an additional approximately 0.017 acre of surface waters. All temporary disturbance areas would be restored to pre-construction condition upon completion of construction activities.

Vegetation

The Travis Junction construction footprint would be located in a previously-disturbed area that does not consist of a unique or ecologically sensitive habitat. Therefore, potential impacts to vegetation would be less than significant.

Wildlife

The Travis Junction construction footprint would be comprised of previously-disturbed habitat that is generally not supportive of ecologically sensitive or unique wildlife species. Therefore, no significant impacts to wildlife are anticipated to result.

Special-Status Species

The Travis Junction would be installed in a previously disturbed area that includes the existing rail spur and is unlikely to provide habitat for special-status species. No direct impacts to special-status species or potentially suitable habitat areas would result. The USFWS *BO* concluded that the Proposed Action would not likely jeopardize Contra Costa goldfields or other special-status species. However, the BO noted that the loss of approximately 0.017 acre of surface waters in the permanent junction footprint would potentially impact Contra Costa goldfields (USFWS 2009). To offset potential impacts, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County, and all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

Operation

Vegetation

A total of approximately 0.15 acre of previously-disturbed vegetative habitat would be located in the permanent Travis Junction footprint. Due to the previously-disturbed nature of the junction footprint, impacts to vegetation are anticipated to be less than significant. Further, any repairs of aboveground equipment would occur in the junction footprint, and none are expected to impact nearby vegetative habitat. With incorporation of detection and monitoring systems and regular inspection and maintenance procedures during Travis Junction operations, impacts to adjacent vegetative habitat would be less than significant.

Wildlife

Installation of the Travis Junction would permanently disturb approximately 0.15 acre of previously-disturbed habitat that is generally not supportive of ecologically sensitive or unique wildlife species. Due to the previously-disturbed nature of the junction footprint, impacts to wildlife are expected to be less than significant. Further, any repairs of aboveground equipment would occur in the junction footprint, and none are expected to impact nearby wildlife habitat. With incorporation of detection and monitoring systems and regular inspection and maintenance procedures during Travis Junction operations, impacts to adjacent wildlife habitat would be less than significant.

Special-Status Species

Because repairs of aboveground equipment would occur in the junction footprint and operations would incorporate detection and monitoring systems and regular inspection and maintenance procedures, no direct impacts to special-status species or potentially suitable habitat areas are anticipated to result from operation of the Travis Junction. However, to offset potential impacts to Contra Costa goldfields, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County, and all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.

4.6.3 Alternative 1 – Proposed Action

4.6.3.1 Travis Pipeline

Construction

Vegetation

Under the Proposed Action, *annual grasslands* would be the primary vegetative habitat located along the Travis Pipeline construction footprint, including in upland areas and within drainage ditches along the north and south sides of the rail spur. In addition, *vernal pool complexes* exist at four locations along the construction footprint where

drainage culverts beneath the rail spur create a hydrologic connection between the north and south ditches (Figure 4-6). Vegetative habitat in these vernal pool complexes is comprised of native species common to Northern claypan vernal pools, including Contra Costa goldfields.

Under the Proposed Action, temporary disturbance associated with pipeline installation would include excavation and temporary soil stockpiling. However, disturbance would be limited to annual grassland vegetative habitats, and impacts to vernal pool complexes would be altogether avoided by the use of HDD along approximately 1.0 mile of the construction footprint (Figure 4-6). Implementation of soil stabilization and erosion control BMPs and restriction of construction activities to the dry season (i.e., 16 April to 14 October) would reduce potential impacts to vegetation in temporarily disturbed areas. All temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species.. As a result, construction-related impacts to vegetation are expected to be less than significant.

Wildlife

Under the Proposed Action, annual grassland habitat that would be temporarily disturbed by installation of the Travis Pipeline is generally not supportive of ecologically sensitive or unique wildlife species. Implementation of BMPs, restriction of construction activities to the dry season, and restoration of temporarily disturbed areas to pre-construction condition would reduce potential impacts to wildlife in temporarily disturbed areas. Disturbance to vernal pools along the construction footprint would be altogether avoided by the use of HDD, and no significant impacts would occur to wildlife in vernal pool habitat. Because habitat along the construction footprint may support nesting raptors and other migratory birds, standard Travis AFB avoidance measures would be implemented to address potential impacts to the burrowing owl, and impacts to other nesting birds would be avoided by using biological monitoring and surveying. As a result, construction-related impacts to wildlife would be anticipated to be less than significant.

Special-Status Species

Under the Proposed Action, potentially suitable habitat for special-status species would be located along the Travis Pipeline construction footprint, including in vernal complexes at four locations where drainage culverts beneath the rail spur create a hydrologic connection between the north and south ditches (Figure 4-6). During a 2008 rare plant survey, Contra Costa goldfields were observed in 19 vernal pools located along the construction footprint (USAF 2008g). Vernal pools along the construction footprint may also potentially provide suitable habitat for special-status invertebrate species (USAF 2008f).

Under the Proposed Action, installation of the Travis Pipeline by the use of HDD along approximately 1.0 mile of the pipeline would altogether avoid potential impacts to special-status species and potentially suitable habitat areas (Figure 4-6).

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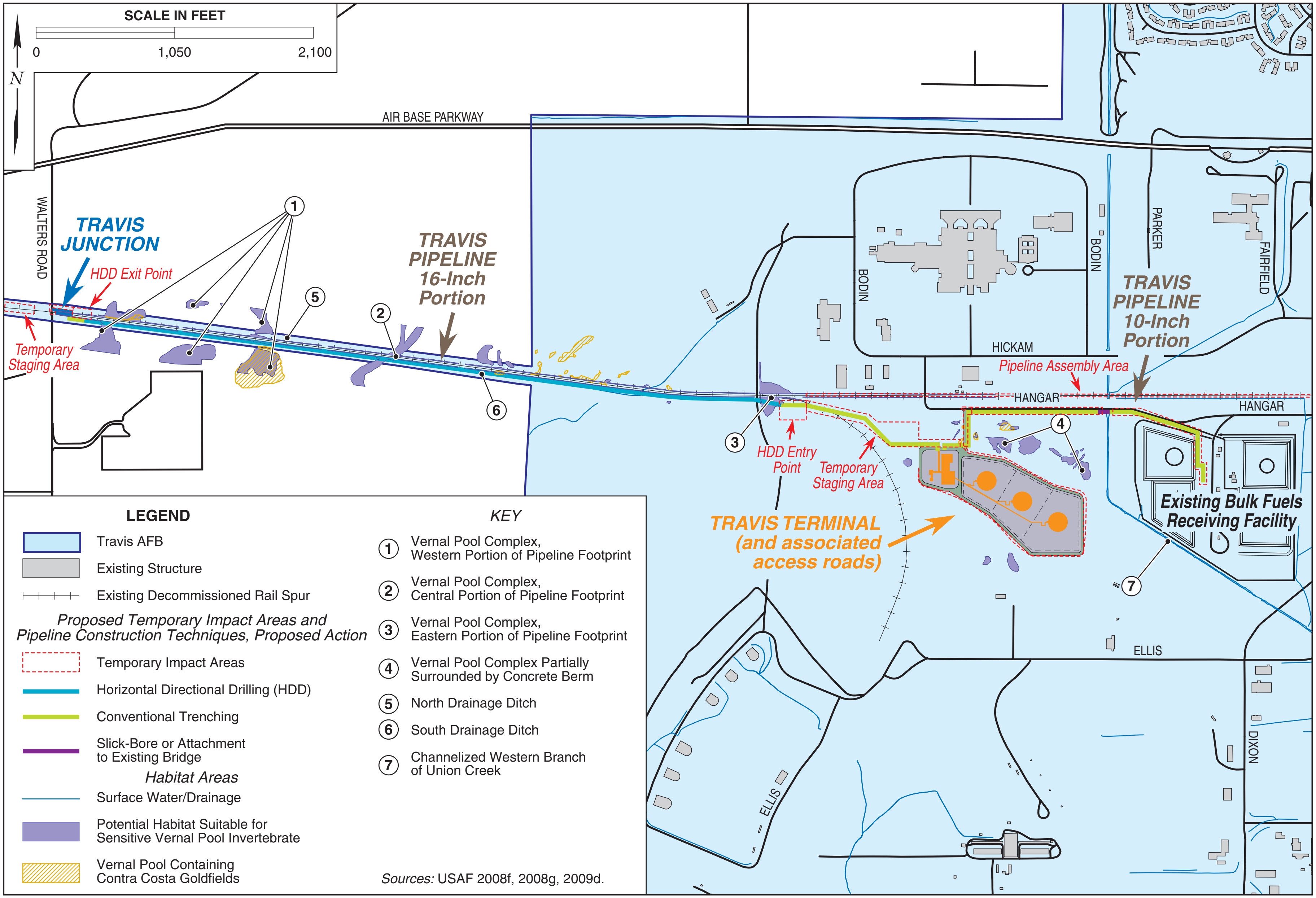

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Travis Pipeline, Construction Techniques and Temporary Impact Areas under the Proposed Action and Notable Habitat Areas

FIGURE 4-6

In areas temporarily disturbed by excavation and soil stockpiling activities, implementation of BMPs, restriction of construction activities to the dry season, and restoration of temporarily disturbed areas to pre-construction condition would reduce potential indirect impacts to special-status species and potentially suitable habitat areas. Accordingly, construction-related impacts to special-status species and potentially suitable habitat areas would be expected to be less than significant.

<u>Operation</u>

Vegetation

Under the Proposed Action, operation of the Travis Pipeline would not be expected to impact vegetation or vegetative habitats. Pipeline operations would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), and regular inspection and maintenance would occur pursuant to DOT *PHMSA* regulations. Pipeline operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. In the event of maintenance or emergency repairs requiring excavation, potentially disturbed areas would be evaluated by a qualified biologist and potential impacts to vegetative habitats would be assessed. If implementation of conservation measures in potentially disturbed areas would not sufficiently reduce potential impacts, excavation activities would undergo separate Section 7 consultation with the USFWS and incorporate separate mitigation for unavoidable impacts. With incorporation of these systems and procedures, operational impacts to vegetation would be less than significant.

Wildlife

Under the Proposed Action, operation of the Travis Pipeline would not be expected to impact wildlife or wildlife habitats. Pipeline operations would incorporate detection and monitoring systems and regular inspection and maintenance procedures, and operations would be incorporated into the SFPP and Travis AFB *ICPs*. In the event of maintenance or emergency repairs requiring excavation, potentially disturbed areas would be evaluated by a qualified biologist and potential impacts to wildlife habitats would be assessed. If implementation of conservation measures in potentially disturbed areas would not sufficiently reduce potential impacts, excavation activities would undergo separate Section 7 consultation with the USFWS and incorporate separate mitigation for unavoidable impacts. With incorporation of these systems and procedures, operational impacts to wildlife would be less than significant.

Special-Status Species

Once operational, access to the Travis Pipeline under the Proposed Action would occur from the raised railbed of the existing decommissioned rail spur. To the extent feasible, pipeline maintenance activities would be conducted only during the dry season, thereby reducing potential impacts to special-status species and potentially suitable special-status species habitat located in the vicinity of the pipeline footprint. Incorporation of detection and monitoring systems (i.e., SCADA system, cathodic

protection, etc.) would further reduce potential impacts. In the event of maintenance or emergency repairs requiring excavation, potentially disturbed areas would be evaluated by a qualified biologist and potential impacts to special-status species and potentially suitable habitat areas would be assessed. If implementation of conservation measures applied in potentially disturbed areas would not sufficiently reduce potential impacts, excavation activities would undergo separate Section 7 consultation with the USFWS and incorporate separate mitigation for unavoidable impacts. With incorporation of these systems and procedures, operational impacts to special-status species and potentially suitable habitat areas are anticipated to be less than significant.

4.6.3.2 Mitigation

Any areas temporarily disturbed from implementation of the Proposed Action would be restored to pre-construction condition, and permanent disturbance would generally be confined to previously disturbed areas unlikely to provide suitable habitat for special-status species, including the existing rail spur and an area currently used for heavy equipment training. The USFWS *BO* concluded that the Proposed Action would not likely jeopardize Contra Costa goldfields or other special-status species. However, to offset potential indirect impacts, the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County, and all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. No additional mitigation would be required.

4.6.3.3 Cumulative Impacts

Construction of the Proposed Action would comply with applicable regulatory requirements and, where needed, would mitigate potentially significant impacts to biological resources. Once operational, activities as a result of the Proposed Action would not be expected to significantly impact biological resources; such activities would be managed in accordance with applicable base documentation (e.g., *INRMP*, etc.). No cumulative impacts to vegetation, wildlife, or special-status species are expected as a result of the Proposed Action.

4.6.4 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.6.4.1 Travis Pipeline

<u>Construction</u>

Vegetation

Under Alternative 2, the vegetative habitat along the Travis Pipeline construction footprint would be comprised of *annual grasslands* and *vernal pool complexes*. Similar to the Proposed Action, temporary disturbance (e.g., excavation, soil stockpiling, etc.)

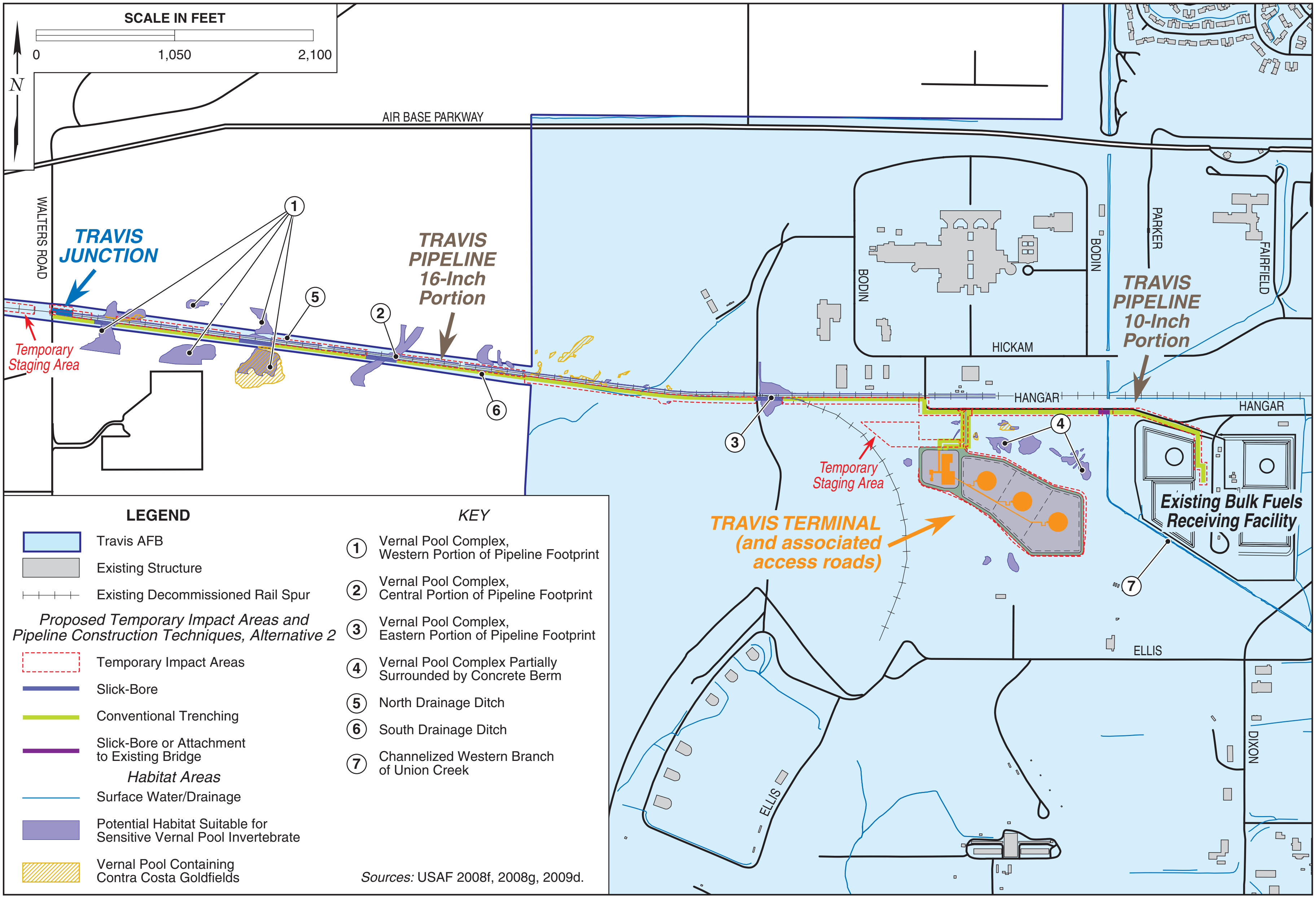
under this alternative would be limited to annual grassland vegetative habitats. However, in order to avoid potential impacts to vernal pool complexes along the construction footprint, the use of slick-bore would occur along four segments containing vegetative habitat associated with vernal pool complexes (Figure 4-7), and HDD would not be used. Alternative 2 would incorporate the same measures as the Proposed Action to address potential impacts to temporarily disturbed areas, including implementation of BMPs, restriction of construction activities to the dry season, and restoration of temporarily disturbed areas to pre-construction condition. As a result, construction-related impacts to vegetation under Alternative 2 would be the same as the Proposed Action, less than significant.

Wildlife

As with the Proposed Action, annual grassland habitat that would be temporarily disturbed by installation of the Travis Pipeline under Alternative 2 is generally not supportive of ecologically sensitive or unique wildlife species. Implementation of the same measures as the Proposed Action (e.g., BMPs, restoration of temporarily disturbed areas to pre-construction condition, etc.) would reduce potential impacts to wildlife in temporarily disturbed areas. Disturbance to vernal pools along the construction footprint would be altogether avoided by the use of slick-bore in four segments containing habitat associated with vernal pool complexes, and no significant impacts would occur to wildlife in vernal pool habitat. Because habitat along the construction footprint may support nesting raptors and other migratory birds, Alternative 2 would incorporate the same avoidance measures and biological monitoring as the Proposed Action. Accordingly, construction-related impacts to wildlife under Alternative 2 would be the same as the Proposed Action, less than significant.

Special-Status Species

As with the Proposed Action, potentially suitable habitat for special-status species would be located along the Travis Pipeline construction footprint under Alternative 2, including multiple vernal complexes. However, in order to avoid potential impacts to special-status species and potentially suitable special-status species habitat, the use of slick-bore would occur along four pipeline segments containing vernal pool complexes (Figure 4-7), and HDD would not be used. Alternative 2 would incorporate the same measures as the Proposed Action to address potential impacts to temporarily disturbed areas, including implementation of BMPs, restricting construction activities to the dry season, and restoring temporarily disturbed areas to pre-construction condition. As a result, construction-related impacts to special-status species and potentially suitable habitat areas under Alternative 2 would be expected to be the same as the Proposed Action, less than significant.



EA

Travis Pipeline, Construction Techniques and Temporary Impact Areas under Alternative 2 and Notable Habitat Areas

FIGURE 4-7

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.

Operation

Vegetation

Operation of the Travis Pipeline under Alternative 2 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. Therefore, operational impacts to vegetation under this alternative would be the same as the Proposed Action, less than significant.

Wildlife

Operation of the Travis Pipeline under Alternative 2 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. Therefore, operational impacts to wildlife under this alternative would be the same as the Proposed Action, less than significant.

Special-Status Species

Operation of the Travis Pipeline under Alternative 2 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. Therefore, operational impacts to special-status species and potentially suitable habitat areas would be the same as the Proposed Action, less than significant.

4.6.4.2 Mitigation

Any areas temporarily disturbed from implementation of Alternative 2 would be restored to pre-construction condition, and permanent disturbance would generally be confined to previously disturbed areas unlikely to provide suitable habitat for special-status species, including the existing rail spur and an area currently used for heavy equipment training. Similar to the Proposed Action, it would be expected that Alternative 2 would not likely jeopardize Contra Costa goldfields or other special-status species. However, as with the Proposed Action, the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County to offset potential indirect impacts, and all temporarily disturbed areas would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. No additional mitigation would be required.

4.6.4.3 Cumulative Impacts

Construction of Alternative 2 would comply with applicable regulatory requirements and, where needed, would mitigate potentially significant impacts to biological resources. Once operational, activities as a result of Alternative 2 are not expected to significantly impact biological resources; such activities would be managed in accordance with applicable base documentation (e.g., *INRMP*, etc.). No cumulative impacts to vegetation, wildlife, or special-status species are expected as a result of Alternative 2.

4.6.5 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.6.5.1 Travis Pipeline

<u>Construction</u>

Vegetation

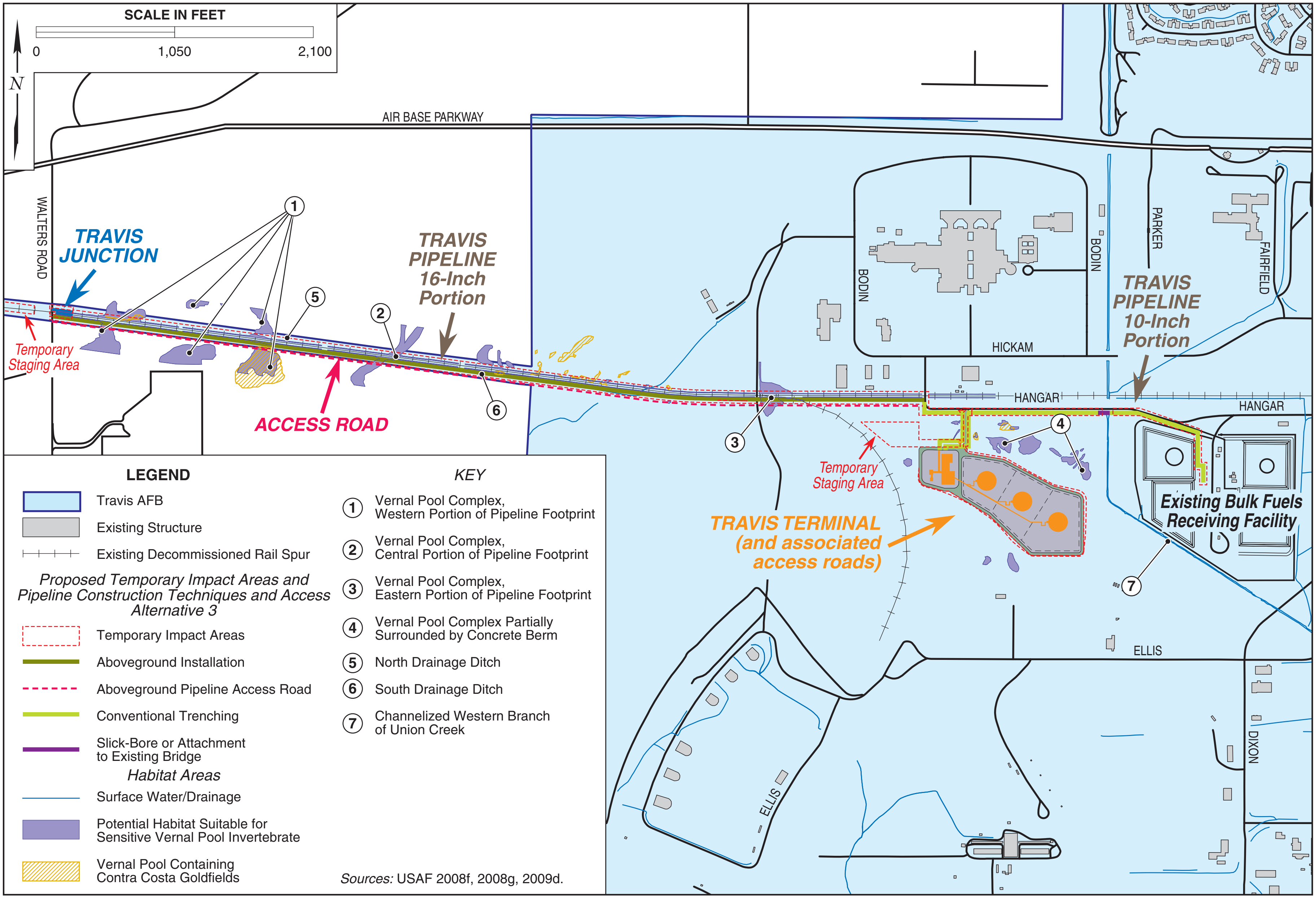
Under Alternative 3, the vegetative habitat along the Travis Pipeline construction footprint would be comprised of *annual grasslands* and *vernal pool complexes*. Temporary disturbance (e.g., excavation, soil stockpiling, etc.) would be mostly limited to annual grassland vegetative habitats. However, construction of the aboveground pipeline segment would include the establishment of a temporary work area that would temporarily disturb approximately 1.71 acres of vegetative habitat associated with vernal pool complexes, including approximately 0.088 acre identified as containing Contra Costa goldfields (Figure 4-8). Restricting activities to the dry season and restoring all temporary disturbance areas to pre-construction condition upon completion of pipeline installation would reduce potential impacts to vegetation in the work area to less than significant levels.

Under Alternative 3, construction of the aboveground portion of the Travis Pipeline would require the establishment of an access road adjacent to the pipeline footprint (Figure 4-8). A total of approximately 3.30 acres of vegetative habitat would be removed due to roadway construction. Removed habitat would be comprised of approximately 3.02 acres of annual grasslands and approximately 0.28 acre of vegetative habitat associated with vernal pool complexes, including approximately 0.093 acre identified as containing Contra Costa goldfields. Establishment of the access road would be anticipated to result in significant and potentially adverse impacts to vegetation. Removal of vegetative habitats under Alternative 3 would also impact special-status species and potentially suitable habitat areas, as discussed in *Special-Status Species* below.

Wildlife

As with the Proposed Action, annual grassland habitat that would be temporarily disturbed by installation of the Travis Pipeline under Alternative 3 is generally not supportive of ecologically sensitive or unique wildlife species. Implementation of the

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



EA

Travis Pipeline, Construction Techniques, Temporary Impact Areas, and Access Road under Alternative 3 and Notable Habitat Areas

FIGURE 4-8

same measures as the Proposed Action (e.g., BMPs, restoration of temporarily disturbed areas to pre-construction condition, etc.) would reduce potential impacts to wildlife in temporarily disturbed areas. In addition, because habitat along the construction footprint may support nesting raptors and other migratory birds, Alternative 3 would incorporate the same avoidance measures and monitoring as the Proposed Action.

Under Alternative 3, establishment of the access road adjacent to the pipeline footprint would result in the removal of approximately 3.02 acres of annual grasslands and approximately 0.28 acre of vegetative habitat associated with vernal pool complexes, including approximately 0.093 acre identified as containing Contra Costa goldfields.

Removal of these habitat areas would result in significant and potentially adverse impacts to wildlife. Removal of habitat areas under Alternative 3 would also impact special-status species and potentially suitable habitat areas, as discussed in *Special-Status Species* below.

Special-Status Species

Under Alternative 3, potentially suitable habitat for special-status species would be located along both the aboveground and belowground segments of the Travis Pipeline construction footprint (refer to Figure 4-8). With regard to the belowground pipeline segment, Alternative 3 would incorporate the same measures as the Proposed Action to address potential impacts to temporarily disturbed areas, including implementation of BMPs, restriction of construction activities to the dry season, and restoration of temporarily disturbed areas to pre-construction condition. As a result, impacts to special-status species and potentially suitable habitat areas along the belowground pipeline segment would be expected to be less than significant.

With regard to the aboveground pipeline segment, no special-status species or potentially suitable habitat areas would be directly located in the pipeline footprint. However, construction of this pipeline segment would include the establishment of a temporary work area adjacent to the pipeline footprint which would overlay the drainage ditch along the south side of the rail spur. Activities in the work area would temporarily disturb approximately 1.71 acres of vernal pool habitat, including approximately 0.088 acre identified as containing Contra Costa goldfields (refer to Figure 4-8). Implementation of the same measures as the Proposed Action (e.g., restricting activities to the dry season, restoring temporarily disturbed areas to pre-construction condition, etc.) would reduce potential impacts to Contra Costa goldfields and other special-status species and potentially suitable habitat areas in the work area to less than significant levels.

Construction of the aboveground portion of the Travis Pipeline would also require the establishment of an access road adjacent to the pipeline footprint (refer to Figure 4-8). In order to partially avoid significant adverse impacts to special-status species and potentially suitable special-status species habitat, the road would be constructed along the south side of the south drainage ditch. However, a total of approximately 0.28 acre

of habitat areas would be removed due to roadway construction, including approximately 0.093 acre identified as containing Contra Costa goldfields and approximately 0.18 acre of vernal pools containing potentially suitable habitat for special-status invertebrate species. Compensatory mitigation would be offered to offset impacts to these habitat areas. However, significant adverse impacts to special-status species and potentially suitable habitat areas would still result. Upon completion of construction activities, the road would be maintained for maintenance access, as further described below.

<u>Operation</u>

Vegetation

Operation of the Travis Pipeline under Alternative 3 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. However, establishment of the pipeline maintenance access road along the south side of the south drainage ditch would result in the loss of approximately 3.02 acres of annual grasslands and approximately 0.28 acre of vegetative habitat associated with vernal pool complexes, including approximately 0.093 acre identified as containing Contra Costa goldfields. The loss of vegetative habitat, especially vernal pools, would potentially impact similar habitat in adjacent areas. Therefore, significant and potentially adverse impacts to vegetation would result.

Wildlife

Operation of the Travis Pipeline under Alternative 3 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. However, loss of habitat areas due to the establishment of the pipeline maintenance access road would result in significant and potentially adverse impacts to wildlife. In addition, the presence of the access road and aboveground pipeline segment would potentially result in adverse conditions for wildlife, including restriction of movement. Therefore, significant and potentially adverse impacts to wildlife would result.

Special-Status Species

Operation of the Travis Pipeline under Alternative 3 would incorporate the same detection and monitoring systems and inspection and maintenance procedures as the Proposed Action, and operations would still be incorporated into the SFPP and Travis AFB *ICPs*. Further, any maintenance or emergency repairs requiring excavation would be subject to the same evaluations and conservation measures as the Proposed Action. However, the loss of approximately 0.28 acre of habitat areas due to establishment of the

pipeline maintenance access road—including approximately 0.093 acre identified as containing Contra Costa goldfields and approximately 0.18 acre of vernal pools containing potentially suitable habitat for special-status invertebrate species—would result in significant adverse impacts to special-status species.

4.6.5.2 Mitigation

Construction and operation of the Travis Pipeline under Alternative 3 would result in significant adverse impacts to biological resources. Impacts would occur during construction and operational phases due to the establishment of a permanent access road along the south side of the south drainage ditch. Impacts would result from the loss of vegetation and wildlife habitat, as well as the loss of approximately 0.28 acre of vernal pool habitat. To offset permanent disturbance to vernal pool habitat—including approximately 0.093 acre identified as containing Contra Costa goldfields and approximately 0.18 acre of vernal pools containing potentially suitable habitat for special-status invertebrate species—the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County. In addition, all temporarily disturbed areas under this alternative would be restored to pre-construction condition within one year of initial disturbance, including restoring pre-construction contours and revegetating with native plant species. No additional mitigation would be required.

4.6.5.3 Cumulative Impacts

Significant impacts to biological resources would result from implementation of Alternative 3. However, construction would comply with applicable regulatory requirements and, where needed, would mitigate potentially significant impacts to biological resources. Once operational, activities associated with Alternative 3 would be managed in accordance with applicable base documentation (e.g., *INRMP*, etc.). No cumulative impacts to vegetation, wildlife, or special-status species would be expected as a result of Alternative 3.

4.6.6 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.6, *Biological Resources*.

4.7 SOCIOECONOMIC RESOURCES

Significance of population and expenditure impacts are assessed in terms of their direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary depending on the location of a Proposed Action or project alternative; for example, implementation of an action that creates 20 employment positions may be unnoticed in an urban area, but may have significant impacts in a more rural region. Socioeconomic impacts would be considered significant if they result in substantial shifts in population trends, or adversely affect regional spending and earning patterns.

4.7.1 Components Common to All Proposed Alternatives

4.7.1.1 Travis Terminal

Construction

Construction of the Travis Terminal would result in short-term economic activity associated with the hiring of temporary construction personnel and purchasing of materials. However, impacts resulting from construction payrolls and materials purchased would last only for the duration of construction activities (i.e., one year) and would be negligible on a regional scale. Accordingly, less than significant impacts to socioeconomic resources would result.

Operation

Operation of the Travis Terminal would be largely automated, and a limited number of personnel would be needed for operations and maintenance activities. Any socioeconomic impacts would be negligible on a regional scale.

4.7.1.2 Travis Junction

Construction

Construction of the Travis Junction would require a small number of personnel (i.e., less than 5) and a relatively insignificant quantity of materials. Any short-term impacts to socioeconomics would be negligible on a regional scale.

Operation

Operation of the Travis Junction would be largely automated, and a limited number of personnel would be needed for operations and maintenance activities. Any socioeconomic impacts would be negligible on a regional scale.

4.7.2 Alternative 1 – Proposed Action

4.7.2.1 Travis Pipeline

Construction

Under the Proposed Action, construction of the Travis Pipeline would result in short-term economic activity from the hiring of temporary construction personnel and purchasing of materials. However, impacts resulting from construction payrolls and materials purchased would last only for the duration of construction activities (i.e., four months) and would be negligible on a regional scale. Consequently, less than significant impacts to socioeconomic resources would result.

Operation

Under the Proposed Action, operation of the Travis Pipeline would be largely automated, and a limited number of personnel would be needed for operations and maintenance activities. Any socioeconomic impacts would be negligible on a regional scale.

4.7.2.2 Mitigation

No significant impacts to socioeconomic resources would be expected to result from the Proposed Action. Therefore, no mitigation would be required.

4.7.2.3 Cumulative Impacts

Travis AFB is the largest employer in Solano County, with a work force of 14,267 and payroll exceeding $685 million. The base's indirect economic impacts to the County are estimated at over $2 billion (USAF 2007d). The Proposed Action would substantially increase the JP-8 storage and distribution capacity at Travis AFB, and enhance the ability of base personnel to conduct mission activities. Implementation of the Proposed Action would potentially increase the viability of Travis AFB's operations and cumulatively contribute to the base's significant and beneficial regional socioeconomic impacts.

4.7.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.7.3.1 Travis Pipeline

Construction

Construction of the Travis Pipeline under Alternative 2 would result in similar short-term economic activity as the Proposed Action; therefore, impacts would be temporary and negligible on a regional scale. Consequently, impacts would be the same as the Proposed Action, less than significant.

Operation

Operation of Travis Pipeline under Alternative 2 would be the same as the Proposed Action; therefore, any socioeconomic impacts would be negligible on a regional scale.

4.7.3.2 Mitigation

No significant impacts to socioeconomic resources would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.7.3.3 Cumulative Impacts

As with the Proposed Action, implementation of Alternative 2 would substantially increase the JP-8 storage and distribution capacity at Travis AFB. Increased fuel storage and distribution capacity would be beneficial to base operations and would

cumulatively contribute to the base's significant and beneficial regional socioeconomic impacts.

4.7.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.7.4.1 Travis Pipeline

Construction

Construction of the Travis Pipeline under Alternative 3 would result in similar short-term economic activity as the Proposed Action. However, impacts would be temporary and would be negligible on a regional scale. Further, installation of the pipeline maintenance and access road along the southern edge of the rail spur would not require substantially larger personnel levels than construction activities under the Proposed Action. Accordingly, impacts under Alternative 3 would be the same as the Proposed Action, less than significant.

Operation

Operation of Travis Pipeline under Alternative 3 would be the same as the Proposed Action; therefore, any socioeconomic impacts would be negligible on a regional scale.

4.7.4.2 Mitigation

No significant impacts to socioeconomic resources would be expected to result from Alternative 3. Therefore, no mitigation would be required.

4.7.4.3 Cumulative Impacts

Similar to the Proposed Action, implementation of Alternative 3 would substantially increase the JP-8 storage and distribution capacity at Travis AFB. Increased fuel storage and distribution capacity would be beneficial to base operations and would cumulatively contribute to the base's significant and beneficial regional socioeconomic impacts.

4.7.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, substantial increases in the JP-8 storage and distribution capacity at Travis AFB would not occur, and the ability of base personnel to conduct mission activities would not be enhanced. Potential increases in the viability of base operations would not occur, and baseline conditions would remain as described in Section 3.7, *Socioeconomic Resources*.

4.8 CULTURAL RESOURCES

Cultural resources are subject to review under both Federal and state laws and regulations. Section 106 of the *NHPA* of 1966 empowers the ACHP to comment on

Federally-initiated, licensed, or permitted projects affecting cultural sites listed or eligible for inclusion on the NRHP. Once cultural resources have been identified, significance evaluation is the process by which resources are assessed relative to significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Only cultural resources determined to be significant (i.e., eligible for the NRHP) are protected under the NHPA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by 1) physically altering, damaging, or destroying all or part of a resource; 2) altering the characteristics of the surrounding environment that contribute to resource significance; 3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or 4) neglecting the resource to the extent that it is deteriorated or destroyed. Direct impacts can be assessed by identifying the type and location of a Proposed Action or project alternative and determining the exact locations of cultural resources that could be affected. Indirect impacts primarily result from the effects of project-induced population increases and the resultant need to develop new housing areas, utilities services, and other support functions necessary to accommodate population growth. These activities and facilities' subsequent use can disturb or destroy cultural resources.

Discussions of potential impacts associated with the Proposed Action and project alternatives focus on the APE, as described in Section 3.8, *Cultural Resources*.

4.8.1.1 State Historic Preservation Office (SHPO) Consultation

On 28 August 2009, the USAF submitted a *Determination and Request for Concurrence* for a finding of "No Historic Properties Affected" (36 CFR § 800.4[d][2]) to the California SHPO. The California SHPO submitted a letter to the USAF on 29 October 2009 stating that it *concurred* with the USAF's finding of "No Historic Properties Affected" (SHPO 2009). Accordingly, implementation of the Proposed Action, Alternative 2, or Alternative 3 would have no impact on cultural resources. Detailed analyses of potential impacts associated with the Proposed Action and project alternatives are presented below. Refer to *Appendix E* for documents related to SHPO consultation.

4.8.2 Components Common to All Proposed Alternatives

4.8.2.1 Travis Terminal

Construction-Related Impacts

Construction of the Travis Terminal would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the terminal footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, construction of the Travis Terminal would have no impact on cultural resources.

Operation-Related Impacts

Operational activities associated with the Travis Terminal would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the terminal footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, operation of the Travis Terminal would have no impact on cultural resources.

4.8.2.2 Travis Junction

Construction-Related Impacts

Construction of the Travis Junction would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the junction footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, construction of the Travis Junction would have no impact on cultural resources.

Operation-Related Impacts

Operational activities associated with the Travis Junction would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the junction footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, operation of the Travis Junction would have no impact on cultural resources.

4.8.3 Alternative 1 – Proposed Action

4.8.3.1 Travis Pipeline

Construction-Related Impacts

Under the Proposed Action, construction of the Travis Pipeline would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the pipeline footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). In addition, the existing rail spur in the pipeline footprint was evaluated during a 1995 basewide cultural resources survey and was determined to be not eligible for listing on the NRHP (HQ AMC 1995). The California SHPO concurred with these findings in a 29 July 1996 letter (SHPO 1996). Consequently, construction of the Travis Pipeline under the Proposed Action would have no impact on cultural resources.

Operation-Related Impacts

Under the Proposed Action, operational activities associated with the Travis Pipeline would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the pipeline footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Accordingly, operation of the Travis Pipeline under the Proposed Action would have no impact on cultural resources.

4.8.3.2 Mitigation

No NRHP-eligible resources have been identified within the APE, and implementation of the Proposed Action would have no impact on cultural resources. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, no mitigation would be necessary.

4.8.3.3 Cumulative Impacts

Although the construction and operation of the Proposed Action would not be expected to result in significant adverse impacts to cultural resources, any potential cumulative impacts would be prevented and/or minimized through implementation of procedures identified in the Travis AFB *ICRMP*. As a result, no cumulative adverse impacts on cultural resources would result from implementation of the Proposed Action.

4.8.4 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.8.4.1 Travis Pipeline

Construction-Related Impacts

Similar to the Proposed Action, construction of the Travis Pipeline under Alternative 2 would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the pipeline footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). In addition, the existing rail spur in the pipeline footprint was evaluated during a 1995 basewide cultural resources survey and was determined to be not eligible for listing on the NRHP (HQ AMC 1995). The California SHPO concurred with these findings in a 29 July 1996 letter (SHPO 1996). Therefore, construction of the Travis Pipeline under Alternative 2 would have no impact on cultural resources.

Operation-Related Impacts

As with the Proposed Action, operational activities associated with the Travis Pipeline under Alternative 2 would occur in a previously-disturbed area, and no buildings or

structures would be demolished or altered. The APE in the vicinity of the pipeline footprint has been previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Accordingly, operation of the Travis Pipeline under Alternative 2 would have no impact on cultural resources.

4.8.4.2 Mitigation

No NRHP-eligible resources have been identified within the APE, and implementation of Alternative 2 would have no impact on cultural resources. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, no mitigation would be necessary.

4.8.4.3 Cumulative Impacts

Although the construction and operation of Alternative 2 would not be expected to result in significant adverse impacts to cultural resources, any potential cumulative impacts would be prevented and/or minimized through implementation of procedures identified in the Travis AFB *ICRMP*. As a result, no cumulative adverse impacts on cultural resources would result from implementation of Alternative 2.

4.8.5 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.8.5.1 Travis Pipeline

<u>Construction-Related Impacts</u>

Similar to the Proposed Action, construction of the Travis Pipeline under Alternative 3 would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the pipeline footprint was previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). In addition, the existing rail spur in the pipeline footprint was evaluated during a 1995 basewide cultural resources survey and was determined to be not eligible for listing on the NRHP (HQ AMC 1995). The California SHPO concurred with these findings in a 29 July 1996 letter (SHPO 1996). Therefore, construction of the Travis Pipeline under Alternative 3 would have no impact on cultural resources.

<u>Operation-Related Impacts</u>

As with the Proposed Action, operational activities associated with the Travis Pipeline under Alternative 3 would occur in a previously-disturbed area, and no buildings or structures would be demolished or altered. The APE in the vicinity of the pipeline footprint has been previously subject to an archaeological survey, and no NRHP-eligible resources were identified. The California SHPO concurred with these findings in a

29 October 2009 letter (SHPO 2009). Accordingly, operation of the Travis Pipeline under Alternative 3 would have no impact on cultural resources.

4.8.5.2 Mitigation

No NRHP-eligible resources have been identified within the APE, and implementation of Alternative 3 would have no impact on cultural resources. The California SHPO concurred with these findings in a 29 October 2009 letter (SHPO 2009). Therefore, no mitigation would be necessary.

4.8.5.3 Cumulative Impacts

Although the construction and operation of Alternative 3 would not be expected to result in significant adverse impacts to cultural resources, any potential cumulative impacts would be prevented and/or minimized through implementation of procedures identified in the Travis AFB *ICRMP*. As a result, no cumulative adverse impacts on cultural resources would result from implementation of Alternative 3.

4.8.6 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.8, *Cultural Resources*.

4.9 LAND USE

Significance of potential land use impacts is based on the level of land use sensitivity in areas affected by implementation of a Proposed Action or project alternative. In general, land use impacts would be considered significant if they: 1) conflict with applicable ordinances and/or permit requirements; 2) are in nonconformance with applicable land use plans; 3) preclude continued activities on adjacent or nearby properties; and/or, 4) conflict with established uses of an area.

Discussions of potential impacts associated with the Proposed Action and project alternatives focus on the proposed Travis AFB real estate outgrant area and adjacent and nearby properties, as described in Section 3.9, *Land Use*. Refer to Figure 3-9 in Section 3.9 for a detailed overview of land use in the vicinity of the proposed outgrant area.

4.9.1 Components Common to All Proposed Alternatives

4.9.1.1 Travis Terminal

Table 4-10 outlines land use in the vicinity of the Travis Terminal footprint and presents a summary of potential construction- and operation-related impacts. Impacts are further discussed in other resource sections where relevant.

Table 4-10 Land Use in the Vicinity of the Proposed Travis Terminal

Direction (Relative to Proposed Travis Terminal)	Property Use	Potential Impacts	
		Construction	Operation
Travis Air Force Base Property			
North	Temporary Construction Contractor Facilities	Less than significant	Less than significant
	Undeveloped (includes vernal pool preserve area)	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*
East	Bulk Fuels Receiving Facility	No impacts; refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*	Beneficial; refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*
	Undeveloped (includes west branch of Union Creek)	Less than significant; refer to Section 4.5, *Water Resources*	Less than significant; refer to Section 4.5, *Water Resources*
South	ERP Site LF044 (former debris stockpiling area)	Less than significant; refer to Section 4.12, *Environmental Management*	Less than significant; refer to Section 4.12, *Environmental Management*
West	Undeveloped (grazing area)	Less than significant	Less than significant

Sources: USAF 2002, 2006a, 2008h, 2009i.

Construction

Construction of the Travis Terminal would be compatible with adjacent and nearby land use, and no significant impacts would result.

Refer to Section 4.12, *Environmental Management*, for information on potential construction-related impacts to land use and access restrictions instituted at ERP Site LF044.

Operation

Operation of the Travis Terminal would be compatible with adjacent and nearby land use, and no significant impacts would result. Further, the terminal would be located near the existing Travis AFB *Bulk Fuels Receiving Facility*, thereby resulting in beneficial impacts due to consolidation of similar land uses.

Refer to Section 4.12, *Environmental Management*, for information on potential operation-related impacts to land use and access restrictions instituted at ERP Site LF044.

4.9.1.2 Travis Junction

Table 4-11 outlines land use in the vicinity of the Travis Junction footprint and presents a summary of potential construction- and operation-related impacts. Impacts are further discussed in other resource sections where relevant.

Table 4-11 Land Use in the Vicinity of the Proposed Travis Junction

Direction (Relative to Proposed Travis Junction)	Property Use	Potential Impacts	
		Construction	**Operation**
Travis Air Force Base Property			
East	Decommissioned Rail Spur	No impacts; refer to Section 4.8, *Cultural Resources*	No impacts; refer to Section 4.8, *Cultural Resources*
Off-Base Property			
North	Undeveloped (includes vernal pool preserve and grazing area)	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*
West	Residential and Commercial Development	Less than significant; refer to Section 4.2, *Noise*, and Section 4.13, *Environmental Justice*	Less than significant; refer to Section 4.2, *Noise*, and Section 4.13, *Environmental Justice*
South	Residential and Institutional Development	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*
	Undeveloped (includes vernal pool preserve and grazing area)	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*

Sources: USAF 2002, 2006a, 2009i.

<u>Construction</u>

Construction of the Travis Junction would be compatible with adjacent and nearby Travis AFB and off-base property land use, and no significant impacts would result.

<u>Operation</u>

Operation of the Travis Junction would be compatible with adjacent and nearby Travis AFB and off-base property land use, and no significant impacts would result.

4.9.2 Alternative 1 – Proposed Action

4.9.2.1 Travis Pipeline

Table 4-12 outlines land use in the vicinity of the Travis Pipeline footprint and presents a summary of potential construction- and operation-related impacts. Impacts are further discussed in other resource sections where relevant.

Construction

Under the Proposed Action, construction of the Travis Pipeline would be compatible with adjacent and nearby Travis AFB and off-base property land use, and no significant impacts would result.

Operation

Under the Proposed Action, operation of the Travis Pipeline would be compatible with adjacent and nearby Travis AFB and off-base property land use, and no significant impacts would result.

4.9.2.2 Mitigation

No significant impacts to Travis AFB or off-base property land use would be expected to result from the Proposed Action. Therefore, no mitigation would be required.

4.9.2.3 Cumulative Impacts

All project components under the Proposed Action would be sited to enhance the operational efficiency of Travis AFB while remaining compatible with existing on- and off-base land use, and no cumulative impacts to land use would be expected to result.

4.9.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.9.3.1 Travis Pipeline

Construction

Construction of the Travis Pipeline under Alternative 2 would be compatible with Travis AFB and off-base property land use (Table 4-12), and impacts would be the same as the Proposed Action, less than significant.

Operation

Operation of the Travis Pipeline under Alternative 2 would be compatible with Travis AFB and off-base property land use (Table 4-12), and impacts would be the same as the Proposed Action, less than significant.

Table 4-12 Land Use in the Vicinity of the Proposed Travis Pipeline

Direction (Relative to Proposed Travis Pipeline)	Property Use	Description	
		Construction	Operation
Travis Air Force Base Property			
North	Aero Club	No impacts	No impacts
	Undeveloped (includes vernal pool preserve and grazing area)	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*
	DGMC-Associated Facilities	Less than significant	Less than significant
	Undeveloped (includes west branch of Union Creek)	Less than significant; refer to Section 4.5, *Water Resources*	Less than significant; refer to Section 4.5, *Water Resources*
East	Undeveloped	Less than significant	Less than significant
	Decommissioned Rail Spur	No impacts; refer to Section 4.8, *Cultural Resources*	No impacts; refer to Section 4.8, *Cultural Resources*
	K-9 Dog Training Facility	Less than significant	Less than significant
South	Bulk Fuels Receiving Facility	No impacts; refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*	Beneficial; refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*
	Temporary Construction Contractor Facilities	No impacts	No impacts
	Munitions Bunker and Associated Access Road	No impacts; refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*	Beneficial; refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*
	Undeveloped (grazing area)	Less than significant	Less than significant
West	Decommissioned Rail Spur	No impacts; refer to Section 4.8, *Cultural Resources*	No impacts; refer to Section 4.8, *Cultural Resources*
Off-Base Property			
North	Undeveloped (includes vernal pool preserve and grazing area)	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*
	Pick-N-Pull	Less than significant	Less than significant
West	Residential and Commercial Development	Less than significant; refer to Section 4.2, *Noise*, and Section 4.13, *Environmental Justice*	Less than significant; refer to Section 4.2, *Noise*, and Section 4.13, *Environmental Justice*

Table 4-12 Land Use in the Vicinity of the Proposed Travis Pipeline (continued)

Direction (Relative to Proposed Travis Pipeline)	Property Use	Description	
		Construction	Operation
South	Residential and Institutional Development	Less than significant; refer to Section 4.2, *Noise*, and Section 4.13, *Environmental Justice*	Less than significant; refer to Section 4.2, *Noise*, and Section 4.13, *Environmental Justice*
	Undeveloped (includes vernal pool preserve and grazing area)	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*	Less than significant; refer to Section 4.5, *Water Resources*, and Section 4.6, *Biological Resources*

Sources: USAF 2002, 2006a, 2009i.

4.9.3.2 Mitigation

No significant impacts to Travis AFB or off-base property land use would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.9.3.3 Cumulative Impacts

Similar to the Proposed Action, all project components under Alternative 2 would be sited to enhance the operational efficiency of Travis AFB while remaining compatible with existing on- and off-base land use, and no cumulative impacts to land use would be expected to result.

4.9.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.9.4.1 Travis Pipeline

<u>Construction</u>

Construction of the Travis Pipeline under Alternative 3 would be compatible with Travis AFB and off-base property land use (refer to Table 4-12), and impacts would be the same as the Proposed Action, less than significant.

<u>Operation</u>

Operation of the Travis Pipeline under Alternative 3 would be compatible with Travis AFB and off-base property land use (refer to Table 4-12), and impacts would be the same as the Proposed Action, less than significant.

4.9.4.2 Mitigation

No significant impacts to Travis AFB or off-base property land use would be expected to result from Alternative 3. Therefore, no mitigation would be required.

4.9.4.3 Cumulative Impacts

Similar to the Proposed Action, all project components under Alternative 3 would be sited to enhance the operational efficiency of Travis AFB while remaining compatible with existing on- and off-base land use, and no cumulative impacts to land use would be expected to result.

4.9.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.9, *Land Use*.

4.10 TRANSPORTATION SYSTEMS

Potential impacts to transportation systems are assessed with respect to anticipated disruption or improvement of current transportation patterns and systems; deterioration or improvement of existing levels of service; and changes in existing levels of transportation safety. Beneficial or adverse impacts may arise from physical changes to circulation (e.g., closing, rerouting, or creating roads), construction activity, introduction of construction-related traffic on local roads, or changes in daily or peak-hour traffic volumes resulting from installation workforce or population changes. Adverse impacts on roadway capacities would be significant if roads with no history of exceeding capacity were forced to operate at or above their full design capacity.

4.10.1.1 CalTrans Traffic Impact Study (TIS)

The California Department of Transportation (CalTrans) requires the preparation of a *Traffic Impact Study* (TIS) when a proposed project would potentially impact traffic LOS in the project vicinity, especially on nearby state highway facilities. CalTrans has established minimum criteria for the preparation of a TIS based on existing LOS ratings and the number of peak hour trips potentially generated by a proposed project (CalTrans 2002). Because activities under the Proposed Action and project alternatives would not generate the number of peak hour trips necessary for preparation of a TIS (CalTrans 2009a; Solano County 2008), it has been excluded from further discussion to keep analysis concise.

4.10.2 Components Common to All Proposed Alternatives

4.10.2.1 Travis Terminal

<u>Construction</u>

Construction of the Travis Terminal would require the delivery of equipment and materials to the project site. Delivery would occur via the Travis AFB South Gate—an entrance used only for the delivery of commercial goods and construction materials to the base—and no impacts to the base's other access points (i.e., Main Entrance Gate, DGMC Gate, etc.) would result. In addition, a majority of equipment would be driven to

and kept at the contractors' staging yard for the duration of construction activities, and transportation of oversized or excessive load construction equipment would be subject to conditions under a CalTrans *Transportation Permit*.

During construction, personnel would commute to/ from the site and would use the Main Entrance Gate to access the base. However, personnel would make up only a small portion of the total existing traffic volume in the vicinity of the gate (refer to Figure 3-10 in Section 3.10, *Transportation Systems*), and any minor increases in traffic volume associated with construction activities would be short-term. Upon completion of construction activities, no long-term impacts to vicinity transportation systems (i.e., Air Base Parkway, Walters Road, etc.) would result.

<u>Operation</u>

Operation of the Travis Terminal would be largely automated. A limited number of personnel would be needed for operations and maintenance activities; however, these activities would be limited in nature and are not anticipated to generate daily traffic to/from the terminal site. Any increases in traffic volume associated with operations would be negligible and would not impact vicinity transportation systems.

4.10.2.2 Travis Junction

<u>Construction</u>

Construction of the Travis Junction would require a small number of personnel (i.e., less than 5) and the delivery of small quantities of equipment and materials. Any increases in traffic volume associated with construction activities would be negligible and short-term, and no significant impacts to vicinity transportation systems (i.e., Walters Road) would result.

<u>Operation</u>

Operation of the Travis Junction would be largely automated. A limited number of personnel would be needed for operations and maintenance activities; however, these activities would be limited in nature and are not anticipated to generate daily traffic to/from the junction site. Any increases in traffic volume associated with operations would be negligible and would not impact vicinity transportation systems.

4.10.3 Alternative 1 – Proposed Action

4.10.3.1 Travis Pipeline

<u>Construction</u>

Under the Proposed Action, construction of the Travis Pipeline would require the delivery of equipment and materials to the project site, and personnel would commute to/from the site. As with the Travis Terminal, pipeline construction deliveries would

occur via the Travis AFB South Gate, and personnel would access the base via the Main Entrance Gate. Construction deliveries and personnel access would make up only a small portion of the total existing traffic volume in the vicinity of the base (refer to Figure 3-10 in Section 3.10, *Transportation Systems*), and any minor increases in traffic volume associated with construction activities would be short-term. Upon completion of construction activities, no long-term impacts to vicinity transportation systems (i.e., Air Base Parkway, Walters Road, etc.) would result.

<u>Operation</u>

Under the Proposed Action, operation of the Travis Pipeline would be largely automated. A limited number of personnel would be needed for operations and maintenance activities; however, these activities would be limited in nature and are not anticipated to generate daily traffic to/from the junction site. Any increases in traffic volume associated with operations would be negligible and would not impact vicinity transportation systems.

4.10.3.2 Mitigation

No significant impacts to transportation systems would result from implementation of the Proposed Action. Therefore, no mitigation would be required.

4.10.3.3 Cumulative Impacts

Estimated ADT volumes near Travis AFB include 18,000 (westbound and eastbound) on Air Base Parkway, 13, 000 (northbound) and 12,000 (southbound) on Peabody Road, and 28,000 (westbound) and 26,000 (eastbound) on SR-12, the nearest State highway facility (refer to Figure 3-10 in Section 3.10, *Transportation Systems*) (Solano County 2008). Any traffic generated from the Proposed Action would be negligible when compared to existing ADT volumes in the project vicinity and would not cumulatively impact vicinity transportation systems.

4.10.4 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.10.4.1 Travis Pipeline

<u>Construction</u>

Similar to the Proposed Action, any increases in traffic volume associated with construction of the Travis Pipeline under Alternative 2 would be short-term and would not significantly impact vicinity transportation systems.

<u>Operation</u>

With regard to traffic generation, operation of the Travis Pipeline under Alternative 2 would be the same as the Proposed Action, and no significant impacts to vicinity transportation systems would result.

4.10.4.2 Mitigation

No significant impacts to transportation systems would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.10.4.3 Cumulative Impacts

Similar to the Proposed Action, traffic generated as a result of activities under Alternative 2 would be negligible when compared to existing ADT volumes and would not cumulatively impact vicinity transportation systems.

4.10.5 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

<u>Construction</u>

Similar to the Proposed Action, any increases in traffic volume associated with construction of the Travis Pipeline under Alternative 3 would be short-term and would not significantly impact vicinity transportation systems. Installation of the pipeline maintenance and access road along the southern edge of the rail spur would not require greater use of equipment or personnel levels than those under the Proposed Action.

<u>Operation</u>

With regard to traffic generation, operation of the Travis Pipeline under Alternative 3 would be the same as the Proposed Action, and no significant impacts to vicinity transportation systems would result.

4.10.5.1 Mitigation

No significant impacts to transportation systems would be expected to result from Alternative 3. Therefore, no mitigation would be required.

4.10.5.2 Cumulative Impacts

Similar to the Proposed Action, traffic generated as a result of activities under Alternative 3 would be negligible when compared to existing ADT volumes and would not cumulatively impact vicinity transportation systems.

4.10.6 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.10, *Transportation Systems*.

4.11 SAFETY AND OCCUPATIONAL HEALTH

Potential impacts to safety and occupational health are assessed with respect to established criteria on facilities siting and design, security, and contingency planning. If implementation of a Proposed Action or project alternative would substantially

increase risks associated with the storage of petroleum fuels or explosives, or would result in incompatible land use with regard to safety criteria such as AT/FP standards or QD arcs, impacts would be considered significant. Further, if an action was incompatible with site-specific safety and occupational health standards, management plans, use restrictions, or other measures, impacts would be considered significant.

4.11.1 Components Common to All Proposed Alternatives

4.11.1.1 Travis Terminal

Petroleum Fuel Facilites Safety

The Travis Terminal would comply with all relevant criteria established under DoD UFC 3-460-01, *Petroleum Fuel Facilities*, including siting, design, construction materials, operations, monitoring, and security measures. The terminal would also comply with all applicable AT/FP standards. To maintain terminal integrity and reduce the likelihood of an accidental release, operations would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), as well as regular inspection as required by DOT *PHMSA* regulations (refer to Section 2.3.2, *Pipeline Operations*). In addition, Travis Terminal operations would be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities (refer to Section 2.3.4, *Emergency Situations*). Therefore, no significant impacts with regard to petroleum fuel facilities safety would be expected to occur.

Explosives Safety

The Travis Terminal would be located outside of on-base QD arcs associated with munitions storage areas; accordingly, explosives safety would not be an issue.

Other Safety Considerations

The proposed Travis Terminal footprint is partially located within a former debris stockpiling area with elevated levels of metals and SVOCs in site soils. Since contamination of surface soils in this area is considered low, potential human health hazards would be minimal provided that site personnel wear appropriate protective equipment. In order to address potential impacts to personnel, a *Health and Safety Plan* would be incorporated during Travis Terminal construction and operation. The plan would outline required protective clothing and other operating procedures which would be implemented to ensure the safety of personnel working on the project site. Implementation of this plan would reduce potential impacts to less than significant levels. Refer to Section 4.12, *Environmental Management*, for additional information on this site.

4.11.1.2 Travis Junction

Petroleum Fuel Facilites Safety

The Travis Junction would comply with all relevant criteria established under DoD UFC 3-460-01, *Petroleum Fuel Facilities*, and all applicable AT/FP standards. The junction would be operated by the same computerized SCADA system as the Travis Terminal, and regular inspection would occur as required by DOT *PHMSA* regulations. Junction operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Accordingly, no significant impacts with regard to petroleum fuel facilities safety would occur.

Explosives Safety

The Travis Junction would be located outside of on-base QD arcs associated with munitions storage areas; therefore, explosives safety would not be an issue.

Other Safety Considerations

No additional safety considerations would be applicable to construction and operation of the Travis Junction.

4.11.2 Alternative 1 – Proposed Action

4.11.2.1 Travis Pipeline

Petroleum Fuel Facilites Safety

Construction and operation of the Travis Pipeline under the Proposed Action would comply with all relevant criteria established under DoD UFC 3-460-01, *Petroleum Fuel Facilities*, and all applicable AT/FP standards. The pipeline would be operated by the same computerized SCADA system as the Travis Terminal and Junction, and regular inspection would occur as required by DOT *PHMSA* regulations. Pipeline operations would also be incorporated into the SFPP and Travis AFB *ICPs* for emergency response activities. Accordingly, no significant impacts with regard to petroleum fuel facilities safety would be expected to occur.

Explosives Safety

Under the Proposed Action, the Travis Pipeline would be located outside of on-base QD arcs associated with munitions storage areas; therefore, explosives safety would not be an issue.

Other Safety Considerations

No additional safety considerations would be applicable to construction and operation of the Travis Pipeline under the Proposed Action.

4.11.2.2 Mitigation

No significant impacts to safety and occupational health would be expected to result from the Proposed Action. Therefore, no mitigation would be required.

4.11.2.3 Cumulative Impacts

The Proposed Action would be sited to enhance operational efficiency of Travis AFB while remaining in compliance with applicable standards for petroleum fuels facilities, AT/FP, explosives safety, and other health and safety standards. Therefore, no cumulative impacts to safety and occupational health would be expected to result.

4.11.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.11.3.1 Travis Pipeline

<u>Petroleum Fuel Facilites Safety</u>

Similar to the Proposed Action, construction and operation of the Travis Pipeline under Alternative 2 would comply with all relevant criteria established under DoD UFC 3-460-01, *Petroleum Fuel Facilities*, and all applicable AT/FP standards. Pipeline operation would also incorporate the same detection and monitoring systems, and regular inspection and maintenance procedures as the Proposed Action. Therefore, impacts with regard to petroleum fuel facilities safety under Alternative 2 would be the same as the Proposed Action, less than significant.

<u>Explosives Safety</u>

As with the Proposed Action, under Alternative 2 the Travis Pipeline would be located outside of on-base QD arcs associated with munitions storage areas; therefore, explosives safety would not be an issue.

<u>Other Safety Considerations</u>

No additional safety considerations would be applicable to construction and operation of the Travis Pipeline under Alternative 2.

4.11.3.2 Mitigation

No significant impacts to safety and occupational health would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.11.3.3 Cumulative Impacts

Similar to the Proposed Action, all project components under Alternative 2 would be sited to enhance operational efficiency of Travis AFB while remaining in compliance with applicable standards for petroleum fuels facilities, AT/FP, explosives safety, and

other health and safety standards. Therefore, no cumulative impacts to safety and occupational health would be expected to result.

4.11.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.11.4.1 Travis Pipeline

Petroleum Fuel Facilites Safety

Similar to the Proposed Action, construction and operation of the Travis Pipeline under Alternative 3 would comply with all relevant criteria established under DoD UFC 3-460-01, *Petroleum Fuel Facilities*, and all applicable AT/FP standards. Pipeline operation would also incorporate the same detection and monitoring systems, and regular inspection and maintenance procedures as the Proposed Action. Therefore, impacts with regard to petroleum fuel facilities safety under Alternative 3 would be the same as the Proposed Action, less than significant.

Explosives Safety

As with the Proposed Action, under Alternative 3 the Travis Pipeline would be located outside of on-base QD arcs associated with munitions storage areas; therefore, explosives safety would not be an issue.

Other Safety Considerations

Under Alternative 3, the Travis Pipeline would be constructed aboveground, which could potentially impact safety and occupational health at Travis AFB. However, incorporation of specific aboveground pipeline inspection and maintenance procedures, as well as 24-hour surveillance, would reduce potential impacts to less than significant levels. No additional safety considerations would be applicable to the Travis Pipeline under Alternative 3.

4.11.4.2 Mitigation

No significant impacts to safety and occupational health would be expected to result from Alternative 3. Therefore, no mitigation would be required.

4.11.4.3 Cumulative Impacts

Similar to the Proposed Action, all project components under Alternative 3 would be sited to enhance operational efficiency of Travis AFB while remaining in compliance with applicable standards for petroleum fuels facilities, AT/FP, explosives safety, and other health and safety standards. Therefore, no cumulative impacts to safety and occupational health would be expected to result.

4.11.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.11, *Safety and Occupational Health*.

4.12 ENVIRONMENTAL MANAGEMENT

Impacts to pollution prevention would be considered significant if implementation of a Proposed Action or project alternative generated, utilized, or released quantities of hazardous materials, waste, toxins, and/or other pollutive elements above established Travis AFB *P2 MAP* directives. Impacts to identified DoD ERP sites would be considered significant implementation if the Proposed Action or project alternative disturbed or created contaminated sites resulting in adverse effects to human health or the environment. An impact to geological resources would be considered significant if implementation of a Proposed Action or project alternative would result in one or more of the following: 1) exposure of people and/or structures to major geological hazards; 2) occurrence of substantial landsliding; 3) occurrence of substantial erosion and/or siltation; and/or, 4) use structural engineering and/or construction techniques which do not adequately address potential geologic hazards.

4.12.1 Components Common to All Proposed Alternatives

4.12.1.1 Travis Terminal

<u>Pollution Prevention</u>

Construction

Construction of the Travis Terminal would not generate a significant quantity of hazardous materials, waste, toxins, and/or other pollutive elements. During construction, BMPs would be incorporated to reduce potential environmental contamination, including soil stabilization and erosion control, and collection and containment of excavated materials. Additional hazardous materials and waste BMPs would also be incorporated (refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*). All Travis Terminal construction activities would comply with established Travis AFB *P2 MAP* directives; therefore, construction-related impacts to pollution prevention would be less than significant.

Operation

Operation of the Travis Terminal is expected to generate a negligible quantity of pollutive elements (i.e., hazardous wastes). Storage, transport, and disposal of pollutive elements would follow all applicable regulations (refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*). Terminal operations would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), as well as regular inspection and maintenance as required by DOT *PHMSA* regulations, to maintain system integrity and reduce the likelihood of accidental releases of pollutive elements. In addition, secondary containment designed to hold over 100 percent of tank capacity

would be installed around each individual tank which would help contain potential spills of pollutive elements within the tank footprint. In the event of an accidental release or emergency repair, pollution prevention procedures established in the SFPP and Travis AFB *ICPs* would be followed. All Travis Terminal operational activities would comply with established Travis AFB *P2 MAP* directives; therefore, operation-related impacts to pollution prevention would be less than significant.

<u>Environmental Restoration Program (ERP)</u>

The Travis Terminal would be partially located within the footprint of ERP Site LF044 (Figure 4-9). Site soils contain elevated levels of metals and SVOCs associated with construction debris (e.g., asphalt and concrete) deposited on the site. Travis AFB has coordinated with the USEPA and has confirmed that a *ROD Amendment* would not be needed to install the proposed Travis Terminal within the footprint of ERP Site LF044. However, as described below, construction and operation of the terminal would incorporate multiple management plans to ensure that the legal requirements in the established *ROD* are met. No other identified ERP sites would be potentially impacted by construction or operation of the Travis Terminal.

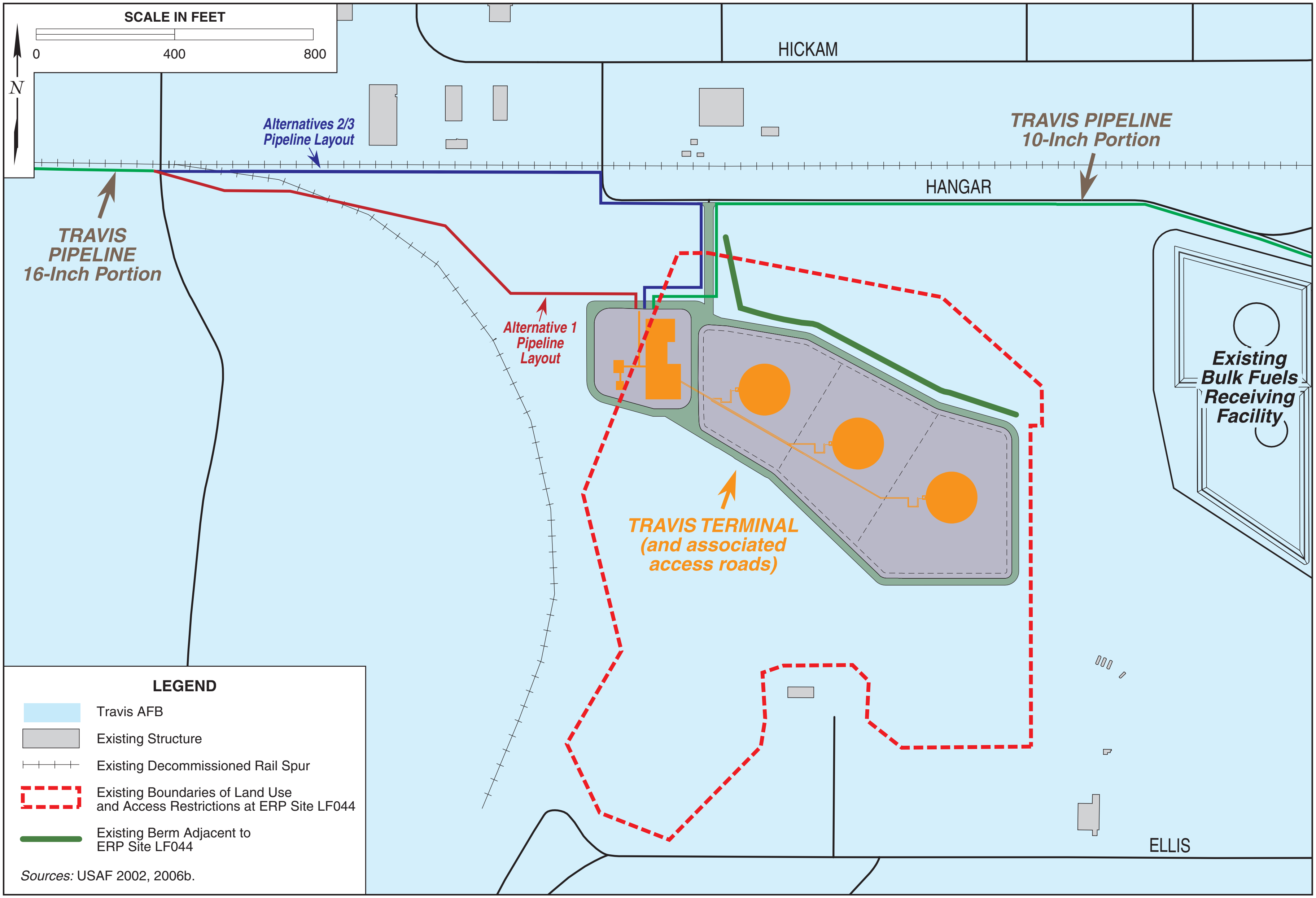
Construction

Prior to construction of the Travis Terminal, all foreign debris (e.g., asphalt and concrete) located within the terminal footprint would be removed from the site. A geotechnical investigation has determined the location and extent of on-site debris (USAF 2009e), and any removal, transport, and disposal of debris would be subject to a Travis AFB-approved *Site Characterization and Disposal Plan*. The plan would establish a set of accepted procedures for the sampling, analyzing, segregating, transporting, and disposing of any on-site debris and contaminated soil within ERP Site LF044, including all reporting requirements, to ensure that the legal requirements in the established *ROD* are met. Implementation of this plan would reduce any impacts to ERP Site LF044 due to removal, transport, and disposal of debris to less than significant levels.

Since contamination of surface soils at the site is considered low, potential human health hazards would be minimal provided that site personnel wear appropriate protective equipment. In order to address potential impacts to personnel, a *Health and Safety Plan* would be incorporated during all phases of construction activities. The plan would outline required protective clothing and other operating procedures which would be implemented to ensure the safety of personnel working on the project site. Implementation of this plan would meet legal requirements in the established *ROD* and reduce potential impacts to less than significant levels.

Prior to construction of the Travis Terminal, the three existing groundwater monitoring wells located in the terminal footprint would be decommissioned. Decommissioning would involve excavating below the ground surface and cutting and capping the wells in accordance with established Federal, state, and local laws, regulations, and guidelines. Decommissioning would also meet all applicable legal requirements in the

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



EA

Environmental Restoration Program (ERP) Site LF044 and Location of Proposed Travis Terminal

FIGURE 4-9

established *ROD*. Accordingly, impacts to ERP Site LF044 associated with decommissioning of the wells would be less than significant.

Operation

Normal operation of the Travis Terminal is not expected to impact ERP Site LF044 and would meet legal requirements in the established *ROD* (USAF 2002). In the event that maintenance activities or emergency scenarios would require excavation of soils, personnel working on-site would be subject to a *Health and Safety Plan* which would outline required protective clothing and other operating procedures to ensure personnel safety. Implementation of this plan would reduce potential impacts to less than significant levels. No other significant impacts would be anticipated to result.

<u>Geological Resources</u>

Construction

Construction of the Travis Terminal would require extensive soil excavation, storage, and backfill. During construction, BMPs would be incorporated to reduce potential impacts to soils; BMPs would include soil stabilization and erosion control, collection and containment of excavated materials, and backfilling all excavated soils to their original location where feasible. Excavation and removal of soils within the footprint of ERP Site LF044 would also be subject to the *Site Characterization and Disposal Plan* described above. Implementation of these measures would reduce potential impacts to soils to less than significant levels. No additional impacts to geological resources would be expected to result from construction of the Travis Terminal.

Operation

Normal operation of the Travis Terminal would not significantly impact soils or other vicinity geological resources. The terminal would be designed to prevent landsliding, erosion, and other potential exposure to geological hazards. Maintenance activities or emergency scenarios involving soil excavation would follow the same BMPs as construction activities, thereby reducing potential impacts to soils to less than significant levels. No other impacts to geological resources would be anticipated to result from operation of the Travis Terminal.

4.12.1.2 Travis Junction

<u>Pollution Prevention</u>

Construction

Construction of the Travis Junction would not generate a significant quantity of pollutive elements (i.e., hazardous waste). BMPs would be incorporated to reduce potential environmental contamination, and all construction activities would comply with Travis AFB *P2 MAP* directives; therefore, construction-related impacts to pollution prevention would be less than significant.

Operation

Operation of the Travis Junction is not anticipated to generate pollutive elements (i.e., hazardous wastes), and operations would incorporate the same detection and monitoring systems, and regular inspection and maintenance procedures as the Travis Terminal. All junction operational activities would comply with Travis AFB *P2 MAP* directives; therefore, operation-related impacts to pollution prevention would be less than significant.

<u>Environmental Restoration Program</u>

Construction and Operation

The Travis Junction would not be located in the vicinity of any identified ERP sites (refer to Figure 3-11 in Section 3.12.2.2, *Environmental Restoration Program*); accordingly, no construction- or operation-related impacts would result.

<u>Geological Resources</u>

Construction

Construction of the Travis Junction would require minimal soil excavation, storage, and backfill. BMPs would be incorporated to reduce potential impacts to soils to less than significant levels, and no additional impacts to geological resources would be expected to result.

Operation

Once operational, the Travis Junction would not significantly impact soils or other vicinity geological resources. Further, the junction would be designed to prevent landsliding, erosion, and other potential exposure to geological hazards.

4.12.2 Alternative 1 – Proposed Action

4.12.2.1 Travis Pipeline

<u>Pollution Prevention</u>

Construction

Under the Proposed Action, construction of the Travis Pipeline is not expected to generate a significant quantity of hazardous materials, waste, toxins, and/or other pollutive elements. During construction, BMPs would be incorporated to reduce potential environmental contamination, especially in areas where HDD or conventional trenching excavation would occur. Specific equipment monitoring and servicing procedures would also be instituted to prevent potential pollution to sensitive habitat areas (refer to Section 4.4, *Wastes, Hazardous Materials, and Stored Fuels*). All Travis Pipeline construction activities would comply with established Travis AFB *P2 MAP* directives; accordingly, construction-related impacts to pollution prevention would be expected to be less than significant.

Operation

Under the Proposed Action, operation of the Travis Pipeline would not be anticipated to generate pollutive elements (i.e., hazardous wastes). Pipeline operations would incorporate detection and monitoring systems (i.e., SCADA system, cathodic protection, etc.), as well as regular inspection and maintenance as required by DOT *PHMSA* regulations, to maintain system integrity and reduce the likelihood of accidental releases of pollutive elements. In the event of an accidental release or emergency repair, pollution prevention procedures established in the SFPP and Travis AFB *ICPs* would be followed. All Travis Pipeline operational activities would comply with established Travis AFB *P2 MAP* directives; therefore, operation-related impacts to pollution prevention would be less than significant.

<u>Environmental Restoration Program</u>

Construction and Operation

The Travis Pipeline would be located in the vicinity of three ERP Sites: LF044, *Landfill X*, DP039, *Building 755*, and SS046, *Railhead Munitions Staging Area* (refer to Figure 3-11 in Section 3.12.2.2, *Environmental Restoration Program*). However, no construction- or operation-related impacts would be anticipated to result.

<u>Geological Resources</u>

Construction

Under the Proposed Action, construction of the Travis Pipeline would require extensive soil excavation, storage, and backfill. During construction, BMPs would be incorporated to reduce potential impacts to soils, including:

- Limiting excavation activities to the dry season (i.e., 16 April through 14 October);
- Retaining the top 9 inches of excavated soil in a separate storage location and replacing such soil upon completion of excavation activities;
- Use of erosion and runoff prevention measures (e.g., silt fencing, minimal watering for dust suppression, etc.) to prevent the loss of topsoil;
- Backfilling all excavated soils to their original location where feasible; and,
- Reestablishing all original surface soil contours upon completion of soil backfill.

Implementation of the BMPs above would reduce potential construction-related impacts to soils to less than significant levels. In addition, a geotechnical investigation evaluated soils in the Travis Pipeline footprint to determine the likelihood of "frac-out" in areas where HDD would be used under the Proposed Action. Because all three soils in the pipeline footprint (Antioch-San Ysidro Complex, Omni Clay Loam, and San Ysidro Sandy Loam) contain hard clay sublayers (refer to Figure 3-12 in Section 3.12.2.3, *Geological Resources*), the likelihood of frac-out would be limited as long as HDD took place within these hard sublayers and beneath surface soils (USAF 2009e). Additional

BMPs specific to reducing the likelihood of frac-out and responding to potential instances of frac-out would also be incorporated during construction, including:

- Designing the angles of the pilot hole entry and exit paths to account for the properties of nearby soils;
- Continuously monitoring drilling mud pressures;
- Stationing equipment on-site to rapidly contain and clean up potential frac-out areas; and,
- Coordinating with appropriate regulatory agencies to assess potential impacts to sensitive habitat areas.

Implementation of these BMPs would reduce potential impacts associated with frac-out to less than significant levels. No additional impacts to geological resources would be anticipated to result from construction of the Travis Pipeline under the Proposed Action.

Operation

Normal operation of the Travis Pipeline under the Proposed Action would not significantly impact soils or other vicinity geological resources. The pipeline would be designed to prevent landsliding, erosion, and other potential exposure to geological hazards. Maintenance activities or emergency scenarios involving soil excavation would follow similar BMPs as construction activities (i.e., retaining and backfilling topsoil, erosion and runoff prevention measures, etc.), and, as feasible, activities would be limited to the dry season. In the event that emergency scenarios would require soil excavation outside of the dry season, assessment of potential impacts to sensitive habitat areas would be coordinated with the appropriate regulatory agencies. Incorporation of these measures would reduce potential impacts to soils to less than significant levels, and no other impacts to geological resources would be expected to result from operation of the Travis Pipeline under the Proposed Action.

4.12.2.2 Mitigation

No significant impacts to pollution prevention, identified ERP sites, or soils or other geological resources would be expected to result from the Proposed Action. Therefore, no mitigation would be required.

4.12.2.3 Cumulative Impacts

All activities under the Proposed Action would comply with established Travis AFB *P2 MAP* directives. All project components would be designed to minimize potential impacts to pollution prevention, identified ERP sites, and soils and other geological resources wherever feasible, and BMPs would be incorporated into construction, operation and maintenance activities, and emergency scenarios to further reduce potential impacts. Accordingly, no cumulative impacts to environmental management would be expected to result from the Proposed Action.

4.12.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.12.3.1 Travis Pipeline

<u>Pollution Prevention</u>

Construction

Under Alternative 2, construction of the Travis Pipeline is not expected to generate a significant quantity of pollutive elements (i.e., hazardous waste). Similar to the Proposed Action, BMPs would be incorporated under this alternative to reduce potential environmental contamination, and all construction activities would comply with Travis AFB *P2 MAP* directives; accordingly, construction-related impacts to pollution prevention would be expected to be less than significant.

Operation

Under Alternative 2, operation of the Travis Pipeline would not be anticipated to generate pollutive elements (i.e., hazardous wastes), and operations would incorporate the same detection and monitoring systems, and regular inspection and maintenance procedures as the Proposed Action. In addition, accidental releases or emergency repairs would still follow pollution prevention procedures established in the SFPP and Travis AFB *ICPs*, and all Travis Pipeline operational activities would comply with Travis AFB *P2 MAP* directives. Consequently, operation-related impacts to pollution prevention would be less than significant.

<u>Environmental Restoration Program (ERP)</u>

Construction and Operation

As with the Proposed Action, the Travis Pipeline under Alternative 2 would be located in the vicinity of three ERP Sites: LF044, *Landfill X*, DP039, *Building 755*, and SS046, *Railhead Munitions Staging Area* (refer to Figure 3-11 in Section 3.12.2.2, *Environmental Restoration Program*). However, no impacts associated with construction or operation would be anticipated to result.

<u>Geological Resources</u>

Construction

Similar to the Proposed Action, construction of the Travis Pipeline under Alternative 2 would require extensive soil excavation, storage, and backfill. However, construction activities would incorporate the same soils management BMPs as the Proposed Action, thereby reducing potential impacts to soils to less than significant levels. Because construction of the pipeline under Alternative 2 would not require the use of HDD, frac-out would not be an issue. No additional impacts to geological resources would be anticipated to result from construction of the Travis Pipeline under Alternative 2.

Operation

As with the Proposed Action, normal operation of the Travis Pipeline under Alternative 2 would not significantly impact soils or other vicinity geological resources, and the pipeline would be designed to prevent potential exposure to geological hazards. In addition, maintenance activities or emergency scenarios involving soil excavation would follow the same BMPs as the Proposed Action, thereby reducing potential impacts to soils to less than significant levels. No other impacts to geological resources would be anticipated to result from operation of the Travis Pipeline under Alternative 2.

4.12.3.2 Mitigation

No significant impacts to pollution prevention, identified ERP sites, or soils or other geological resources would be expected to result from Alternative 2. Therefore, no mitigation would be required.

4.12.3.3 Cumulative Impacts

As with the Proposed Action, all activities under Alternative 2 would comply with established Travis AFB *P2 MAP* directives. All project components would be designed to minimize potential impacts to pollution prevention, identified ERP sites, and soils and other geological resources wherever feasible, and BMPs would be incorporated into construction, operation and maintenance activities, and emergency scenarios to further reduce potential impacts. Accordingly, no cumulative impacts to environmental management would be expected to result from Alternative 2.

4.12.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

<u>Pollution Prevention</u>

Construction

Under Alternative 3, construction of the Travis Pipeline is not expected to generate a significant quantity of pollutive elements (i.e., hazardous waste). Similar to the Proposed Action, BMPs would be incorporated under this alternative to reduce potential environmental contamination, and all construction activities would comply with Travis AFB *P2 MAP* directives; accordingly, construction-related impacts to pollution prevention would be expected to be less than significant.

Operation

Under Alternative 3, operation of the Travis Pipeline would not be anticipated to generate pollutive elements (i.e., hazardous wastes), and operations would incorporate the same detection and monitoring systems, and regular inspection and maintenance procedures as the Proposed Action. Because the pipeline would be constructed aboveground under this alternative, the likelihood of accidental releases of pollutive elements would be greater than the Proposed Action. However, any accidental releases or emergency repairs would still follow pollution prevention procedures established in

the SFPP and Travis AFB *ICPs*, thereby reducing potential impacts to less than significant levels. Further, all Travis Pipeline operational activities would still comply with Travis AFB *P2 MAP* directives. Accordingly, operation-related impacts to pollution prevention under Alternative 3 would be less than significant.

<u>Environmental Restoration Program (ERP)</u>

Construction and Operation

As with the Proposed Action, the Travis Pipeline under Alternative 3 would be located in the vicinity of three ERP Sites: LF044, *Landfill X*, DP039, *Building 755*, and SS046, *Railhead Munitions Staging Area* (refer to Figure 3-11 in Section 3.12.2.2, *Environmental Restoration Program*). However, no impacts associated with construction or operation would be anticipated to result.

<u>Geological Resources</u>

Construction

Under Alternative 3, installation of the Travis Pipeline would occur aboveground in the footprint of the existing rail spur. While soil excavation activities associated with pipeline construction would be greatly reduced, implementation of this alternative would require establishment of an access road along the southern edge of the rail spur. Establishment of the access road would cause compaction of soils and permanent alternation of soil topography in the roadway footprint, thereby resulting in significant adverse impacts to soils. However, no additional impacts to geological resources would result from construction of the Travis Pipeline under Alternative 3.

Operation

Under Alternative 3, installation of the Travis Pipeline aboveground would largely eliminate soil excavation activities associated with pipeline maintenance and repairs. As with the Proposed Action, the pipeline under this alternative would also be designed to prevent potential exposure to geological hazards. As a result, operational impacts to soils and other geological resources would be expected to be less than significant.

4.12.4.1 Mitigation

No significant impacts to pollution prevention or identified ERP sites would result from Alternative 3. Establishment of the access road along the southern edge of the rail spur would result in significant adverse impacts to soils due to permanent compaction and alteration of soils in the roadway footprint. Incorporation of mitigation, including limiting soil disturbance to areas within the roadway footprint, would reduce potential impacts to surrounding areas, as well as eliminate cumulative impacts to nearby soils. However, no mitigation would fully address significant adverse impacts to soils within the roadway footprint resulting from this alternative. No additional impacts to geological resources would be anticipated to result from Alternative 3; therefore, no additional mitigation would be required.

4.12.4.2 Cumulative Impacts

Similar to the Proposed Action, all activities under Alternative 3 would comply with established Travis AFB *P2 MAP* directives, and all project components would be designed to minimize potential impacts to pollution prevention, identified ERP sites, and soils and other geological resources to the greatest extent feasible. Further, incorporation of mitigation to reduce potential impacts to soils adjacent to the access road footprint would eliminate cumulative impacts to soils in the vicinity of the Travis Pipeline. Therefore, no cumulative impacts to environmental management would be expected to result from Alternative 2.

4.12.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would remain as described in Section 3.12, *Environmental Management*.

4.13 ENVIRONMENTAL JUSTICE

In order to comply with EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, ethnicity and poverty status in Solano County and the cities of Fairfield and Suisun City were compared to state and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the Proposed Action or project alternatives. Similarly, to comply with EO 13045, *Protection of Children from Environmental Health and Safety Risks*, the distribution of children and locations where populations of children may be concentrated were identified within 2 miles of the project footprint to ensure that any environmental health and safety risks to children would be addressed.

4.13.1 Components Common to All Proposed Alternatives

4.13.1.1 Travis Terminal

<u>Minority and Low-Income Populations</u>

No minority or low-income populations are disproportionately located in the vicinity of the Travis Terminal footprint, and the closest residential areas are at least 0.5 mile away. Potential short-term construction-related impacts would be confined to the terminal footprint, and no significant adverse impacts to on-base or off-base minority or low-income populations would result. Once operational, impacts associated with the Travis Terminal would be minimal and would not result in any significant adverse impacts to minority or low-income populations.

<u>Protection of Children from Environmental Health and Safety Risks</u>

In general, the percentage of the population represented by children under 18 is not disproportionately higher in the vicinity of the Travis Terminal footprint. Multiple locations where concentrations of children may gather, including Travis Elementary

School and the DGMC, are located in the vicinity of the terminal footprint (refer to Table 3-33 in Section 3.13.2.2, *Protection of Children from Environmental Health and Safety Risks*). However, potential construction and operational impacts would be confined to the terminal footprint, and no significant adverse impacts to nearby facilities would result. Further, children would not have access to any portion of the terminal footprint, and the Travis Terminal is not expected to result in any increased health or safety risks to children. Therefore, with implementation of standard safety measures (e.g., security fencing around the terminal footprint), no significant adverse impacts to children would result.

4.13.1.2 Travis Junction

Minority and Low-Income Populations

No minority or low-income populations are disproportionately located in the vicinity of the Travis Pipeline footprint, and the closest on-base residential areas are at least 0.25 mile away. Potential short-term construction-related impacts would be confined to the junction footprint, and no significant adverse impacts to nearby minority or low-income populations would result. Once operational, impacts associated with the Travis Junction would be minimal and would not result in any significant adverse impacts to minority or low-income populations.

Protection of Children from Environmental Health and Safety Risks

In general, the percentage of the population represented by children under 18 is not disproportionately higher in the vicinity of the Travis Junction footprint, and all locations where concentrations of children may gather (e.g., schools, parks, etc.) are located at least 0.75 mile from the junction footprint (refer to Table 3-33 in Section 3.13.2.2, *Protection of Children from Environmental Health and Safety Risks*). Potential construction and operational impacts would be confined to the junction footprint, and no significant adverse impacts to nearby facilities would result. Further, children would not have access to any portion of the junction footprint, and the Travis Junction would not be expected to result in any increased health or safety risks to children. Therefore, with implementation of standard safety measures, no significant adverse impacts to children would result.

4.13.2 Alternative 1 – Proposed Action

4.13.2.1 Travis Pipeline

Minority and Low-Income Populations

No minority or low-income populations are disproportionately located in the vicinity of the Travis Pipeline footprint under the Proposed Action; the closest on-base residential areas are at least 0.5 mile away, and the closest off-base residential areas are at least 0.25 mile away. Potential short-term construction-related impacts would be confined to

the pipeline footprint, and no significant adverse impacts to on-base or off-base minority or low-income populations would result. Once operational, impacts associated with the Travis Pipeline would be minimal and would not result in any significant adverse impacts to minority or low-income populations.

Protection of Children from Environmental Health and Safety Risks

In general, the percentage of the population represented by children under 18 is not disproportionately higher in the vicinity of the Travis Pipeline footprint under the Proposed Action. Multiple locations where concentrations of children may gather, including Travis Elementary School and the DGMC, are located in the vicinity of the pipeline footprint (refer to Table 3-33 in Section 3.13.2.2, *Protection of Children from Environmental Health and Safety Risks*). However, potential construction and operational impacts would be confined to the pipeline footprint, and no significant adverse impacts to nearby facilities would result. Further, children would not have access to any portion of the pipeline footprint, and the Travis Pipeline is not expected to result in any increased health or safety risks to children. Therefore, with implementation of standard safety measures, no significant adverse impacts to children would result.

4.13.2.2 Mitigation

No significant impacts with regard to environmental justice or protection of children would be expected to result from implementation of the Proposed Action. Therefore, no mitigation would be required.

4.13.2.3 Cumulative Impacts

All activities under the Proposed Action would avoid disproportionate impacts to minority and low-income populations, as well as impacts to populations of children and locations where concentrations of children may gather. Accordingly, implementation of the Proposed Action would not cumulatively contribute to significant adverse impacts with regard to environmental justice and protection of children.

4.13.3 Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques

4.13.3.1 Travis Pipeline

Minority and Low-Income Populations

Similar to the Proposed Action, impacts related to construction and operation of the Travis Pipeline under Alternative 2 would be confined to the pipeline footprint, and no significant adverse impacts to minority or low-income populations would result.

Protection of Children from Environmental Health and Safety Risks

As with the Proposed Action, impacts related to construction and operation of the Travis Pipeline under Alternative 2 would be confined to the pipeline footprint, and the same

standard safety measures would be incorporated. Therefore, no significant adverse impacts to populations of children or locations where concentrations of children may gather would result.

4.13.3.2 Mitigation

No significant impacts with regard to environmental justice or protection of children would be expected to result from implementation of Alternative 2. Therefore, no mitigation would be required.

4.13.3.3 Cumulative Impacts

All activities under Alternative 2 would avoid disproportionate impacts to minority and low-income populations, as well as impacts to populations of children and locations where concentrations of children may gather. Accordingly, implementation of this alternative would not cumulatively contribute to significant adverse impacts with regard to environmental justice and protection of children.

4.13.4 Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur

4.13.4.1 Travis Pipeline

Minority and Low-Income Populations

Similar to the Proposed Action, impacts related to construction and operation of the Travis Pipeline under Alternative 3 would be confined to the pipeline footprint, and no significant adverse impacts to minority or low-income populations would result.

Protection of Children from Environmental Health and Safety Risks

As with the Proposed Action, impacts related to construction and operation of the Travis Pipeline under Alternative 3 would be confined to the pipeline footprint, and the same standard safety measures would be incorporated. Additional safety measures specific to the aboveground pipeline (e.g., security fencing around the pipeline, 24-hour surveillance, etc.) would also be included under Alternative 3. Therefore, no significant adverse impacts to populations of children or locations where concentrations of children may gather would result.

4.13.4.2 Mitigation

No significant impacts with regard to environmental justice or protection of children would be expected to result from implementation of Alternative 3. Therefore, no mitigation would be required.

4.13.4.3 Cumulative Impacts

All activities under Alternative 3 would avoid disproportionate impacts to minority and low-income populations, as well as impacts to populations of children and locations where concentrations of children may gather. Accordingly, implementation of this alternative would not cumulatively contribute to significant adverse impacts with regard to environmental justice and protection of children.

4.13.5 Alternative 4 – No-Action Alternative

If the No-Action Alternative were selected, baseline conditions would as described in Section 3.13, *Environmental Justice.*

4.14 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts would result from implementation of the Proposed Action, Alternative 2, or Alternative 3.

Air Quality

The emission of air pollutants associated with construction and operation of the proposed facilities under the Proposed Action, Alternative 2, and Alternative 3 would be an unavoidable condition, but would not be considered significant and would not impede attainment or maintenance of standards within the AQCR. Further, while emissions of the proposed facilities would not be subject to the emission cap currently permitted for Travis AFB by the BAAQMD, the amount of emissions associated with the proposed facilities would not significantly impede the emission cap.

Wastes, Hazardous Materials, and Stored Fuels

The potential for accidents or spills at the proposed facilities, and the generation of hazardous wastes would be unavoidable conditions associated with the Proposed Action, Alternative 2, and Alternative 3. However, the potential for these unavoidable situations would not significantly increase over baseline conditions, and therefore would not be considered significant.

Water Resources

Temporary disturbance to the drainage ditches along the north and south sides of the rail spur during construction of the Travis Pipeline and Travis Junction would be an unavoidable condition associated with the Proposed Action, Alternative 2, and Alternative 3. However, all temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities. Permanent disturbance to approximately 0.017 acre of the south drainage ditch due to installation of the Travis Junction would be an additional unavoidable condition associated with the Proposed Action, Alternative 2, and Alternative 3. However, stormwater would be redirected to the north drainage ditch through the installation of a culvert, and the USAF would purchase conservation credits

at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County to offset the loss of approximately 0.017 acre of surface waters.

Permanent disturbance to approximately 0.28 acre of wetland areas due to the establishment of a pipeline access road would be an additional unavoidable condition associated specifically with Alternative 3. Changes to surface hydrology would be minimized through the installation of culverts under the roadway footprint, and the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County to offset permanent disturbance to wetland areas. However, significant adverse impacts to water resources would still result from implementation of Alternative 3.

<u>Biological Resources</u>

Temporary disturbance to potential special-status species habitat within the drainage ditches along the north and south sides of the rail spur during construction of the Travis Pipeline and Travis Junction would be an unavoidable condition associated with the Proposed Action, Alternative 2, and Alternative 3. However, all temporary disturbance areas would be restored to pre-construction contours and revegetated with native species within one year of initiation of project activities.

Permanent disturbance to approximately 0.28 acre of vernal pool habitat due to the establishment of a pipeline access road would be an additional unavoidable condition associated specifically with Alternative 3. Permanent disturbance would occur to approximately 0.093 acre of vernal pools identified as containing the special-status plant species Contra Costa goldfields and approximately 0.18 acre of vernal pools containing potentially suitable habitat for special-status invertebrate species. To offset permanent disturbance to vernal pool habitat, the USAF would purchase conservation credits at a USFWS-approved mitigation bank. However, significant adverse impacts to biological resources would still be expected to result from implementation of Alternative 3.

<u>Safety and Occupational Health</u>

The potential for accidents or spills at the proposed facilities and the generation of hazardous wastes would be unavoidable conditions associated with the Proposed Action, Alternative 2, and Alternative 3. However, the potential for these unavoidable situations would not significantly increase over baseline conditions, and therefore would not be considered significant. The potential for exposure to elevated levels of metals and SVOCs in surface soils at the Travis Terminal would be an additional unavoidable condition associated with the Proposed Action, Alternative 2, and Alternative 3. However, contamination of surface soils is considered low and potential safety and occupational health hazards during Travis Terminal construction and operation would be addressed in a *Health and Safety Plan*, and therefore would not be considered significant.

Environmental Management

The potential for accidents or spills at the proposed facilities, and the generation of hazardous wastes would be unavoidable conditions associated with the Proposed Action, Alternative 2, and Alternative 3. However, the potential for these unavoidable situations would not significantly increase over baseline conditions, and therefore would not be considered significant.

4.15 Relationship Between Short-Term Uses and Enhancement of Long-Term Productivity

Neither the Proposed Action, Alternative 2, nor Alternative 3 would result in intensification of land use in the area surrounding Travis AFB. Development of the Proposed Action, Alternative 2, or Alternative 3 would not represent a significant loss of open space. Each project component would be installed in a location designated for such uses which was not planned for use as open space. Therefore, it is not anticipated that the Proposed Action, Alternative 2, or Alternative 3 would result in any cumulative land use or aesthetic impacts. Long-term productivity of the sites upon which each project component would be installed would be increased by development of the Proposed Action, Alternative 2, or Alternative 3.

4.16 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of the Proposed Action, Alternative 2, or Alternative 3 involve consumption of material resources, energy resources, land, water resources, biological habitat, and human resources. The use of these resources is considered to be permanent.

Material Resources

Building materials, concrete and asphalt, and various material supplies would be used for development of the Proposed Action, Alternative 2, or Alternative 3. Most of these materials are not in short supply and are readily available from suppliers in the region. Use of these materials would not limit other unrelated construction activities.

Energy Resources

Energy resources such as petroleum-based products (i.e., gasoline, diesel fuel, etc.), natural gas, and electricity would be used for development of the Proposed Action, Alternative 2, or Alternative 3 and would be irretrievably lost. Gasoline and diesel would be used for operation of construction vehicles, and natural gas and electricity would be used to operate the project components. Consumption of these energy resources would not place a significant demand on their supply systems or within the region.

Land

Implementation of the Proposed Action, Alternative 2, or Alternative 3 would result in the loss of open land due to construction of the project components. However, each project component would be installed in a location designated for such uses, and long-term productivity of the sites upon which each project component would be installed would be increased.

Water Resources

Implementation of the Proposed Action, Alternative 2, or Alternative 3 would result in the loss of approximately 0.017 acre of drainage ditch along the south side of the rail spur. However, stormwater would be redirected to the north drainage ditch through the installation of a culvert, and the USAF would purchase conservation credits at a 9:1 ratio (totaling approximately 0.153 acre) at a USFWS-approved mitigation bank in Solano County to offset the loss of approximately 0.017 acre of surface waters.

Implementation of Alternative 3 would additionally result in the loss of approximately 0.28 acre of wetland areas due to the establishment of a pipeline access road. However, changes to surface hydrology would be minimized through the installation of culverts under the roadway footprint, and the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County to offset permanent disturbance to wetland areas. While localized impacts to water resources would be significant and adverse, no significant impacts would occur to nearby water resources.

Biological Resources

Implementation of Alternative 3 would result in the irreversible commitment of approximately 0.28 acre of vernal pool habitat, including approximately 0.093 acre of vernal pools identified as containing the special-status plant species Contra Costa goldfields and approximately 0.18 acre of vernal pools containing potentially suitable habitat for special-status invertebrate species. To offset permanent disturbance to vernal pool habitat, the USAF would purchase conservation credits at a USFWS-approved mitigation bank in Solano County. While the action would remove open space currently functioning as biological habitat, significant adverse impacts would be localized, and no significant impacts would occur to nearby biological resources.

Human Resources

The use of human resources for construction and operation of the project components is considered an irretrievable loss only in that it would preclude the affected personnel from engaging in other work activities. However, the use of human resources for the Proposed Action, Alternative 2, or Alternative 3 represents employment opportunities, and would therefore be beneficial.

SECTION 5
LIST OF PREPARERS

Name	Degree	Resource(s)	Years of Experience
Henry, Michael	*PhD, Ecology, Evolution, and Marine Biology* *B.S., Aquatic Biology*	-Lead Technical Review	8
McFarling, Doug	*B.S., Environmental Studies*	-Description of Proposed Project and Alternatives -Technical Review	17
Ricono, Nick	*M.S., Biology* *B.S., Biology*	-Description of Proposed Project and Alternatives -Biological Resources -Water Resources -Technical Review	11
Sjulin, Scott	*B.S., Urban Design and Development*	-Finding of No Significant Impact -Executive Summary -Description of Proposed Project and Alternatives -Air Quality -Biological Resources -Cultural Resources -Environmental Justice -Environmental Management -Land Use -Noise -Safety and Occupational Health -Socioeconomic Resources -Transportation Systems -Wastes, Hazardous Materials, and Stored Fuels -Water Resources -Unavoidable Adverse Impacts -Irreversible and Irretrievable Commitment of Resources -Relationship between Short-Term Uses and Enhancement of Long-Term Productivity	2
Sullo, Shellie	*B.A., Anthropology*	-Cultural Resources	17

SECTION 6
PERSONS AND AGENCIES CONSULTED

The following persons and agencies were consulted during preparation of this EA:

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Solano Economic Development Corporation, Fairfield, California

Turba, Andy

U.S. Fish and Wildlife Service, Sacramento, California

Tovar, Michelle

San Francisco Regional Water Quality Control Board

Uchman, Jolanta

U.S. Army Corps of Engineers, San Francisco District

Straub, Peter

SECTION 7
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APPENDIX A

AIR FORCE FORM 813

REQUEST FOR ENVIRONMENTAL IMPACT ANALYSIS	Report Control Symbol RCS: 08-064

INSTRUCTIONS: *Section I to be completed by Proponent; Sections II and III to be completed by Environmental Planning Function. Continue on separate sheets as necessary. Reference appropriate item number(s).*

SECTION I - PROPONENT INFORMATION

1. TO *(Environmental Planning Function)*	2. FROM *(Proponent organization and functional address symbol)*	2a. TELEPHONE NO.
60 CEV	60 CES/CECC	4-5794

3. TITLE OF PROPOSED ACTION
Proposed project will install 3 new Kinder Morgan (KM) jet fuel tanks, JP8 150,000 BBLS EACH, and receipt line as shown on attached map.

4. PURPOSE AND NEED FOR ACTION *(Identify decision to be made and need date)*
New Kinder Morgan owned fuel tanks will allow the existing fuel receipt line to be shut down and deactivated. Old receipt line is over 50 years old.

5. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES (DOPAA) *(Provide sufficient details for evaluation of the total action.)*
Install three new tanks as shown on attached map. New receipt line will enter TAFB from Walters Road down existing railroad tracks and new line will suppy fuel from the KM site to Bulk Fuel. New power will enter site from existing transformer area.

6. PROPONENT APPROVAL *(Name and Grade)*	6a. SIGNATURE	6b. DATE
James Christensen YD-02		

SECTION II - PRELIMINARY ENVIRONMENTAL SURVEY. *(Check appropriate box and describe potential environmental effects Including cumulative effects.) (+ = positive effect; 0 = no effect; - = adverse effect; U= unknown effect)*

Item	+	0	-	U
7. AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE *(Noise, accident potential, encroachment, etc.)*				
8. AIR QUALITY *(Emissions, attainment status, state implementation plan, etc.)* Air conformity determination is not required IAW 40 CFR 93.253(c)(1).		X		
9. WATER RESOURCES *(Quality, quantity, source, etc.)* See comments		X		
10. SAFETY AND OCCUPATIONAL HEALTH *(Asbestos/radiation/chemical exposure, explosives safety quantity-distance, bird/wildlife aircraft hazard, etc.)*				
11. HAZARDOUS MATERIALS/WASTE *(Use/storage/generation, solid waste, etc.)* Please ensure the contractor complies w/the encl Chap 5 of the TAFB HWMP.		X		
12. BIOLOGICAL RESOURCES *(Wetlands/floodplains, threatened or endangered species, etc.)* IMPACTS TO CTS, VERNAL POOLS EFFECTED			X	
13. CULTURAL RESOURCES *(Native American burial sites, archaeological, historical, etc.)*		X		
14. GEOLOGY AND SOILS *(Topography, minerals, geothermal, Installation Restoration Program, seismicity, etc.)* SEE NOTE IN BLOCK 18, REMARKS BELOW.	X			
15. SOCIOECONOMIC *(Employment/population projections, school and local fiscal impacts, etc.)*				
16. OTHER *(Potential impacts not addressed above.)*				

An Environmental Assessment is required, do not award without an approved FONSI or ROD.

SECTION III - ENVIRONMENTAL ANALYSIS DETERMINATION

17. ☐ PROPOSED ACTION QUALIFIES FOR CATEGORICAL EXCLUSION (CATEX) # ________ ; OR
☒ PROPOSED ACTION DOES NOT QUALIFY FOR A CATEX; FURTHER ENVIRONMENTAL ANALYSIS IS REQUIRED.

18. REMARKS (1) PROJECT SITE IS LOCATED ON EXISTING LAND USE CONTROL SITE. THESE LAND USE RESTRICTION DO NOT PRECLUDE INDUSTRIAL ACTIVITIES SUCH AS FUEL TANKS. AN AMMENDMENT TO THE WABOU RECORD OF DECISION AND REGULATORY CONCURRENCE WILL BE REQUIRED. CONTACT 60 CES/CEVR @ 4-3062 FOR MORE INFORMATION REGARDING ON-SITE CONTAMINATION.
(2) AN ENVIRONMENTAL BASELINE SURVEY (EBS) IS REQUIRED FOR LEASING THIS PROPERTY TO KINDER MORGAN

19. ENVIRONMENTAL PLANNING FUNCTION CERTIFICATION *(Name and Grade)*	19a. SIGNATURE	19b. DATE
DAVID H. MUSSELWHITE, YF-02, DAF Chief, Environmental Flight		7 APR 08

KINDER MORGAN BULK FUEL PROJECT

APPENDIX B

INTERAGENCY AND INTERGOVERNMENTAL CORRESPONDENCE FOR ENVIRONMENTAL PLANNING (IICEP)

Appendix B
Interagency and Intergovernmental Correspondence for Environmental Planning (IICEP)

Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*, provides procedures to comply with applicable Federal, state, and local directives for Interagency and Intergovernmental Coordination for Environmental Planning (IICEP). AFI 32-7060 implements the following:

- Air Force Planning Document 32-70, *Environmental Quality*;
- Department of Defense (DoD) Directive 4165.61, *Intergovernmental Coordination of DoD Federal Development Programs and Activities*;
- Executive Order 12372, *Intergovernmental Review of Federal Programs*;
- Title IV of the *Intergovernmental Coordination Act* (ICA) of 1968; and,
- Section 204 of the *Demonstration Cities and Metropolitan Development Act* of 1966.

Section 401(b) of the ICA states that, "All viewpoints – national, regional, state, and local… will be fully considered… when planning federal or federally-assisted development programs and projects."

To comply with IICEP, on 12 August 2009, the U.S. Air Force (USAF) notified numerous agencies in the state of California of the intent to outgrant real estate for the construction of a jet fuel (JP)-8 pipeline and receiving facility at Travis Air Force Base (AFB). The Draft *Environmental Assessment* (EA) and Draft *Finding of No Significant Impact* (FONSI) were sent to Federal, state, and local agencies for review. A state of California *Form A* was included with the notification letter sent to the California State Clearinghouse. The letter to agencies, the distribution list, and the California State Clearinghouse *Form A* are contained in this appendix (refer to pages B-3 to B-8).

The USAF received comment letters from the following agencies (listed in order of date of letter):

- California Department of Transportation (CalTrans), dated 20 August 2009 (CalTrans 2009a); and
- City of Fairfield, Community Development Department, dated 4 September 2009 (Fairfield 2009).

Agency comment letters and, where applicable, associated follow-up correspondence are contained in this appendix (refer to pages B-9 to B-19). Responses to agency comment letters and, as applicable, changes to the EA and/or FONSI text as a result of agency comments are summarized following each letter.

On 18 August 2009, the USAF released a Draft EA *Addendum* to describe slight changes to the Proposed Action and project alternatives as a result of information obtained after releasing the Draft EA and Draft FONSI for agency distribution and public comment on 12 August 2009. Refer to Appendix C, *Draft Environmental Assessment (EA) Addendum*, for additional information.

In addition to agency notification, the USAF sent a *Determination and Request for Concurrence* for a finding of "No Historic Properties Affected" (36 Code of Federal Regulations [CFR] § 800.4[d][2]) to the California State Historic Preservation Office (SHPO). On 29 October 2009, the California SHPO submitted a letter to the USAF stating that it *concurred* with USAF's finding of "No Historic Properties Affected" (SHPO 2009). Refer to Appendix E, *State Historic Preservation Office (SHPO) Consultation*, for additional information.

To notify the public, the USAF published a *Notice of Availability* (NOA) announcing the 30-day public comment period and the availability of the Draft EA and Draft FONSI in two local newspapers, and copies of the documents were placed in four local libraries. Refer to Appendix E, *Public Notification*, for additional information.

DEPARTMENT OF THE AIR FORCE
60TH CIVIL ENGINEER SQUADRON (AMC)

MEMORANDUM FOR SEE DISTRIBUTION

FROM: 60 CES/CEA/CEAO
411 Airman Drive
Travis AFB, CA 94535

SUBJECT: Environmental Assessment for the Outgrant of Real Estate and Construction of a JP-8 Pipeline and Receiving Facility, Travis AFB

The U.S. Air Force is preparing an Environmental Assessment (EA) for the proposed outgrant of real estate and construction of a jet fuel (JP-8) pipeline and receiving facility at Travis AFB, California. The Proposed Action addresses security and capacity shortfalls in the existing JP-8 distribution and dispensation infrastructure at Travis AFB.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation and solicit comments on the attached Draft EA. The following paragraph describes the Proposed Action, two alternative actions, and the No-Action Alternative. Please provide any comments no later than 30 days from the date of this letter directly to Mr. Scott Sjulin, AMEC Earth and Environmental, 10670 White rock Road (Suite 100), Rancho Cordova, CA 95670-6032.

The Proposed Action would outgrant real estate to SFPP, LP, for construction of a 1.8-mile JP-8 pipeline and receiving facility. The other alternatives include pipeline installation by slick-bore and aboveground construction. Under the No-Action Alternative, a new JP-8 pipeline and receiving facility would not be constructed.

If members of your staff have any questions regarding this EA, please contact Mr. Scott Sjulin, (805) 259-7434.

RMPontemayor
RUDY M. PONTEMAYOR, P.E.
Environmental Planner

Attachments:
1. Draft EA
2. Distribution List

IICEP Distribution List

Table B-1 presents a list of the Federal, state, and local agencies that were notified of the intent to outgrant real estate for the construction of a JP-8 pipeline and receiving facility at Travis AFB.

Table B-1 Interagency and Intergovernmental Correspondence for Environmental Planning (IICEP) Distribution List

Federal Agencies	
Department of the Air Force Air Mobility Command Attn: Mr. Doug Allbright, HQ AMC/A7PC 507 Symington Drive Scott AFB, IL 62225	Air Force Western Regional Environmental Office Attn: Mr. Gary Munsterman AFCEE/TDW 50 Fremont Street, Suite 2450 San Francisco, CA 94105-2230
U.S. Department of the Interior U.S. Fish and Wildlife Service CA/NV Operations Office 2800 Cottage Way, Room W-2606 Sacramento, CA 95825	U.S. Environmental Protection Agency, Region 9 Director, Officer of Federal Activities 75 Hawthorne Street San Francisco, CA 94105
State Agencies	
State of California Clearinghouse Governor's Office 1400 Tenth Street, Room 121 Sacramento, CA 95814	California Air Resources Board Air Quality and Transportation Division 1001 "I" Street Sacramento, CA 95812
California Department of Fish and Game 1416 Ninth Street Sacramento, CA 95814	Bay Area Air Quality Management District 939 Ellis Street San Francisco, CA 94109-7799
Milford Wayne Donaldson, FAIA State Historic Preservation Officer Department of Parks and Recreation 1416 Ninth Street, Room 1442 Sacramento, CA 95814	
County	
Solano County Department of Resource Management 675 Texas Street, Suite 5500 Fairfield, CA 94533	
City	
City of Fairfield Community Development Department 1000 Webster Street Fairfield, CA 94533	Suisun City Community Development Department 701 Civic Center Boulevard Suisun, CA 94588
City of Vacaville Community Development Department 650 Merchant Street Vacaville, CA 95688	

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Draft Environmental Assessment for the Outgrant of Real Estate and Construction of JP8 Facilities, Travis AFB

Lead Agency: USAF, 60th Air Mobility Wing
Contact Person: Mr. Rudy Pontemayor
Mailing Address: 411 Airman Drive, Travis AFB, CA 94535
Phone: (707)- 424-7517
City: Fairfield
Zip: 94535
County: Solano

Project Location: County: Solano
City/Nearest Community: Fairfield
Cross Streets: Airbase Parkway/Walters Road
Zip Code: 94535
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W Total Acres:
Assessor's Parcel No.: Section: Twp.: Range: Base:
Within 2 Miles: State Hwy #: 12
Waterways: Union Creek, Western Branch
Airports: Travis AFB
Railways: SPRR
Schools: Various

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) Other:

NEPA: ☐ NOI ☑ EA ☐ Draft EIS ☑ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other:

Local Action Type:

☐ General Plan Update
☐ General Plan Amendment
☐ General Plan Element
☐ Community Plan
☐ Specific Plan
☐ Master Plan
☐ Planned Unit Development
☐ Site Plan
☐ Rezone
☐ Prezone
☐ Use Permit
☐ Land Division (Subdivision, etc.)
☐ Annexation
☐ Redevelopment
☐ Coastal Permit
☑ Other: NA

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational:
☐ Recreational:
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type
☐ Mining: Mineral
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type
☑ Other: NA

Project Issues Discussed in Document:

☐ Aesthetic/Visual
☐ Agricultural Land
☑ Air Quality
☑ Archeological/Historical
☑ Biological Resources
☐ Coastal Zone
☑ Drainage/Absorption
☑ Economic/Jobs
☐ Fiscal
☐ Flood Plain/Flooding
☐ Forest Land/Fire Hazard
☐ Geologic/Seismic
☐ Minerals
☑ Noise
☐ Population/Housing Balance
☐ Public Services/Facilities
☑ Recreation/Parks
☑ Schools/Universities
☐ Septic Systems
☐ Sewer Capacity
☑ Soil Erosion/Compaction/Grading
☐ Solid Waste
☐ Toxic/Hazardous
☑ Traffic/Circulation
☑ Vegetation
☐ Water Quality
☑ Water Supply/Groundwater
☑ Wetland/Riparian
☐ Growth Inducement
☑ Land Use
☑ Cumulative Effects
☑ Other: Hazmat

Present Land Use/Zoning/General Plan Designation:

NA

Project Description: *(please use a separate page if necessary)*
Outgrant of approximately 33.4 acres of Travis AFB land to SFPP to construct fuel storage tanks and pipeline.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

S	Air Resources Board		Office of Emergency Services
	Boating & Waterways, Department of	S	Office of Historic Preservation
	California Highway Patrol		Office of Public School Construction
	Caltrans District # ____		Parks & Recreation, Department of
	Caltrans Division of Aeronautics		Pesticide Regulation, Department of
	Caltrans Planning		Public Utilities Commission
	Central Valley Flood Protection Board		Regional WQCB # ____
	Coachella Valley Mtns. Conservancy		Resources Agency
	Coastal Commission		S.F. Bay Conservation & Development Comm.
	Colorado River Board		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Conservation, Department of		San Joaquin River Conservancy
	Corrections, Department of		Santa Monica Mtns. Conservancy
	Delta Protection Commission		State Lands Commission
	Education, Department of		SWRCB: Clean Water Grants
	Energy Commission		SWRCB: Water Quality
S	Fish & Game Region # ____		SWRCB: Water Rights
	Food & Agriculture, Department of		Tahoe Regional Planning Agency
	Forestry and Fire Protection, Department of		Toxic Substances Control, Department of
	General Services, Department of		Water Resources, Department of
	Health Services, Department of		
	Housing & Community Development	S	Other: Federal Agencies (AMC, USFWS, EPA, DESC)
	Integrated Waste Management Board	S	Other: City & County Planning Agencies, BAAQMD
	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date August 12, 2009 Ending Date September 11, 2009

Lead Agency (Complete if applicable):

Consulting Firm: AMEC Earth and Environmental
Address: 10670 White Rock Road, Suite 100
City/State/Zip: Rancho Cordova, CA 95670-6032
Contact: Scott Sjulin
Phone: (805) 259-7434

Applicant: 60 CES/CEAN
Address: 411 Airman Drive
City/State/Zip: Travis AFB, CA 94535
Phone: (707) 424-7517

Signature of Lead Agency Representative: Scott Sjulin **Date:** 08/10/2009

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

Agency Comment Letters and Related Correspondence and Responses

The USAF received comment letters from the following agencies regarding the intent to outgrant real estate for the construction of a JP-8 pipeline and receiving facility at Travis AFB (listed in order of date of letter):

- CalTrans, dated 20 August 2009 (CalTrans 2009a); and
- City of Fairfield, Community Development Department, dated 4 September 2009 (Fairfield 2009).

Agency comment letters and, where applicable, associated follow-up correspondence are contained in this appendix, beginning on page B-11. Responses to agency comment letters and, as applicable, changes to the EA and/or FONSI text as a result of agency comments are summarized following each letter.

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 622-5491
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

Rec'd 27 Aug 09
RMP

August 20, 2009

SOL080447
SOL-80-19.18
SCH#2009084003

Mr. Rudy Pontemayor
United States Air Force, 60th Air Mobility Wing
411 Airmen Drive
Travis Air Force Base, CA 94535

Dear Mr. Pontemayor:

Outgrant of the Real Estate and Construction of Jet Propulsion(JP)-8 Facilities, Travis Air Force Base(AFB) – Draft Environmental Assessment(EA)

Thank you for including the California Department of Transportation (Department) in the environmental review process for the Outgrant of Real Estate and Construction of the JP-8 Facilities Project. The following comments are based on the EA.

As lead agency, the United States Air Force (USAF) is responsible for all project mitigation, including any needed improvements to State highways. The project's fair share contribution, financing, scheduling, and implementation responsibilities as well as lead agency monitoring should be fully discussed for all proposed mitigation measures and the project's traffic mitigation fees should be specifically identified in the EA.

Any required roadway improvements should be completed prior to issuance of project occupancy permits. An encroachment permit is required when the project involves work in the State's right of way (ROW). The Department will not issue an encroachment permit until our concerns are adequately addressed. Therefore, we strongly recommend that the lead agency ensure resolution of the Department's environmental concerns prior to submittal of the encroachment permit application; see the end of this letter for more information regarding the encroachment permit process.

Traffic Impact Study (TIS)
The Department is primarily concerned with impacts to the State Highway System. The proposed project is located near State facilities. Please ensure that the environmental analysis evaluates the traffic impacts on State facilities by applying the following criteria to determine if a TIS is warranted:

1. The project will generate over 100 peak hour trips assigned to a State highway facility.

2. The project will generate between 50 to 100 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing noticeable delay; approaching unstable traffic flow (level of service (LOS) "C" or "D") conditions.

3. The project will generate between 1 to 49 peak hour trips assigned to a State highway facility, and the affected highway facilities are experiencing significant delay; unstable or forced traffic flow (LOS "E" or "F") conditions.

We recommend using the Department's *"Guide for the Preparation of Traffic Impact Studies"* for determining which scenarios and methodologies to use in the analysis. It is available at the following website address:
http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

Cultural Resources
If construction activities are proposed within the State's ROW, the Department requires documented results of a current archaeological record search from the Northwest Information Center (NIC) of the California Historical Resources Information System before an encroachment permit can be issued. Current record searches must be no more than five years old.

The Department requires the records search, and if warranted, a cultural resource study by a qualified, professional archaeologist, to ensure compliance with NEPA (if there is federal action on the project), CEQA, Section 5024.5 of the California Public Resources Code (for state-owned historic resources) and Volume 2 of the Department's *"Standard Environmental Reference"*, available at http://www.dot.ca.gov/hq/env/index.htm). Work subject to these requirements includes, but is not limited to: lane widening, channelization, auxiliary lanes, and/or modification of existing features such as slopes, drainage features, curbs, sidewalks and driveways within or adjacent to State ROW.

Transportation Permit
Project work that requires movement of oversized or excessive load vehicles on State roadways requires a transportation permit that is issued by the Department. To apply, a completed transportation permit application with the determined specific route(s) for the shipper to follow from origin to destination must be submitted to the address below.

Office of Transportation Permits
California DOT Headquarters
P.O. Box 942874
Sacramento, CA 94274-0001

See the following website link for more information:
http://www.dot.ca.gov/hq/traffops/permits/.

Encroachment Permit
Any work or traffic control within the State ROW requires an encroachment permit that is issued by the Department.

To apply for an encroachment permit, submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans which clearly indicate State ROW to the address at the top of this letterhead, marked ATTN: Michael Condie, Mail Stop #5E.

Should you have any questions regarding this letter, please contact Lisa Courington of my staff at (510) 286-5505.

Sincerely,

Lisa Carboni

LISA CARBONI
District Branch Chief
Local Development - Intergovernmental Review

c: State Clearinghouse

CalTrans Comment Letter, Dated 20 August 2009
Related Correspondence and Responses

The USAF received a comment letter from CalTrans, dated 20 August 2009, regarding the intent to outgrant real estate for the construction of a JP-8 pipeline and receiving facility at Travis AFB (CalTrans 2009a).

Mr. Scott Sjulin of AMEC Earth & Environmental, Inc. (AMEC), on behalf of the USAF, contacted via telephone Ms. Lisa Carboni of CalTrans on 14 September 2009 to discuss the content of CalTrans' comment letter (CalTrans 2009b). In summary, Ms. Carboni stated that the comment letter was intended to provide information rather than specific directives, and the applicant would have discretion to determine the level of follow-up warranted based upon the applicant's proposed scope of activities. Accordingly, the USAF has determined that the responses and text changes summarized in Table B-2 below would be needed to address CalTrans' comment letter.

Table B-2 Summary of CalTrans Comments and USAF Responses

CalTrans Comment	USAF Response	Changes to Text
Applicant shall prepare a *Traffic Impact Study* (TIS) if specific criteria on peak hour trip generation and level of service (LOS) on a State Highway Facility are met. For example, if a project generates a total of between 50 to 100 peak hour trips on a State Highway Facility with a LOS of "C" or "D," preparation of a TIS would be warranted.	The Proposed Action and project alternatives would generate a maximum of 40 peak hour trips on State Route (SR)-12, the nearest State Highway Facility. SR-12 has a LOS of "A-C" eastbound and "D" eastbound in the vicinity of Travis AGB. Accordingly, preparation of a TIS would not be warranted.	Section 3.10.2.2, *Local Transportation Systems*: updated text to include existing LOS on roadways in the vicinity of Travis AFB. Revised Figure 3-10 to include LOS. Section 4.10, *Transportation Systems*: updated text to discuss potential LOS impacts during project construction and operation.
Applicant shall conduct a cultural resources records search if construction activities would occur in the State's right-of-way (ROW).	No construction activities are proposed in the State's ROW; therefore, this comment is not applicable.	No changes made.
Applicant shall file for a Transportation Permit if project work requires the movement of oversized or excessive load vehicles on State roadways.	The Proposed Action and project alternatives would include the movement of oversized vehicles to/from the project site. Applicant has filed for all necessary permits, including a Transportation Permit.	Section 4.10, *Transportation Systems*: updated text to state that movement of oversized vehicles to/from the project site would occur and all necessary permits have been obtained.
Applicant shall file for an Encroachment Permit if project work and/or traffic control would take place in the State's ROW.	No construction activities or traffic control are proposed in the State's ROW; therefore, this comment is not applicable.	No changes made.

Sources: CalTrans 2009a, 2009b; Solano County 2008.

HEART OF SOLANO COUNTY
FAIRFIELD
CALIFORNIA
Home of
Travis Air Force Base

CITY OF FAIRFIELD

Founded 1856 Incorporated December 12, 1903

COMMUNITY DEVELOPMENT DEPARTMENT

Rec'd
9/14/09
RMP

September 4, 2009

Mr. Rudy M. Pontemayor
USAF 60th Air Mobility Wing (AMW) 60 CES/CEV
411 Airmen Drives Division
Travis AFB, CA 94535

Re: JP8 Pipeline and Receiving Facility Environmental Assessment

Dear Mr. Pontemayor:

The City of Fairfield has reviewed the Draft EA for the JP8 Pipeline and Receiving Facility project at Travis Air Force Base. We have no comments at this time. Please do note that any work within City of Fairfield right-of-way will require coordination with the Fairfield Public Works Department and an encroachment permit. You may contact Mr. George Hicks, City Engineer, at 707.428.7485 with any questions on that matter. Please feel free to call me at 707.428.7446 if you have any questions.

Sincerely,

Brian Miller

BRIAN MILLER
Associate Planner

BKM:ccs

cc: Erin L. Beavers, Director of Community Development
George Hicks, Public Works Department

City of Fairfield Comment Letter, Dated 4 September 2009
Related Correspondence and Responses

The USAF received a comment letter from the City of Fairfield Community Development Department, dated 4 September 2009, regarding the intent to outgrant real estate for the construction of a JP-8 pipeline and receiving facility at Travis AFB (Fairfield 2009).

Mr. Scott Sjulin of AMEC, on behalf of the USAF, reviewed the letter and confirmed that no additional correspondence with the City of Fairfield or text changes were needed to address the City's comments, as summarized in Table B-3 below.

Table B-3 Summary of City of Fairfield Comments and USAF Responses

City of Fairfield Comment	USAF Response	Changes to Text
Applicant shall file for an Encroachment Permit if project work would take place in the City's ROW.	No construction activities or traffic control are proposed in the City's ROW; therefore, this comment is not applicable.	No changes made.

Source: Fairfield 2009.

APPENDIX C

DRAFT ENVIRONMENTAL ASSESSMENT (EA)
ADDENDUM

Appendix C
Draft Environmental Assessment (EA) Addendum

The USAF prepared a Draft EA *Addendum* to describe slight changes to the Proposed Action, Alternative 2, and Alternative 3 as a result of information obtained after releasing the Draft EA and Draft FONSI for agency distribution and public comment on 12 August 2009.

On 18 August 2009, the USAF distributed a Draft EA Addendum letter, summary of revisions to the Draft EA and Draft FONSI text, and three revised Draft EA figures to the agencies on the IICEP Distribution List (refer to Appendix B, Table B-1) and to four local libraries (refer to Appendix D, Table D-1). The Addendum letter, summary of text revisions, and revised figures are contained in this appendix (refer to pages C-3 to C-17).

Changes described in the Draft EA Addendum affected additional figures beyond the three revised Draft EA figures distributed on 18 August 2009. Where applicable, any required revisions have been incorporated into the figures contained within the Final EA, and all such revisions are summarized in this appendix (refer to pages C-19 to C-22).

On 20 August 2009, the final legal description of the proposed real estate outgrant area was submitted to the USAF by a professional surveyor (USAF 2009a). Preparation of the final legal description did not result in any changes to the project layouts, temporary disturbance areas, or potential impacts associated with the Proposed Action, Alternative 2, or Alternative 3. However, because the final legal description was developed by use of professional surveying techniques, slight changes did result for total acreages of the real estate outgrant areas, project layouts, and temporary disturbance areas associated with each project alternative. These revised totals and associated text revisions are also contained in this appendix (refer to pages C-23 to C-33).

DEPARTMENT OF THE AIR FORCE
60TH CIVIL ENGINEER SQUADRON (AMC)

MEMORANDUM FOR: SEE DISTRIBUTION

18 August 2009

FROM: 60 CES/CEA/CEAO
411 Airman Drive
Travis AFB, CA 94535

SUBJECT: ***Addendum to Draft Environmental Assessment for the Outgrant of Real Estate and Construction of a JP-8 Pipeline and Receiving Facility, Travis AFB***

The U.S. Air Force presents this Addendum to the *Draft Environmental Assessment (EA) for the proposed outgrant of real estate and construction of a jet fuel (JP-8) pipeline and receiving facility at Travis AFB, California.*

The purpose of this Addendum is to describe slight changes to the Proposed Action and two alternatives as a result of information obtained after releasing the Draft EA for agency distribution and public comment on Wednesday 12 August 2009 ("Draft EA"). Where specifically cited below, the information contained within this Addendum shall supersede information in the Draft EA.

The Proposed Action and two alternatives have been revised such that their implementation would avoid a vernal pool and associated preserve area ("VP 180") that was recently determined to be located within the temporary construction footprints associated with these actions. Information on VP 180 was obtained from *Vernal Pool and Endangered Species Mitigation for Travis AFB* by S.K. Collinge, 1999 ("USAF 1999").

Refer to **Attachment 1** for revisions to Draft EA text based upon information in USAF 1999.

Refer to **Attachments 2 through 4** for revisions to Draft EA figures based upon information in USAF 1999. The figures show both the original project footprint and any revisions per USAF 1999. It should be noted that revisions per USAF 1999 will affect all figures in the Draft EA that show the proposed pipeline footprints under the Proposed Action and/or the two alternatives. However, the attached revised figures are limited to those from Section 2, *Description of Alternatives Including the Proposed Action*.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation and solicit comments on this Addendum and the Draft EA. Please provide any comments no later than 30 days from the date of this letter directly to Mr. Scott Sjulin, AMEC Earth & Environmental, 10670 White Rock Road (Suite 100), Rancho Cordova, CA 95670-6032.

If members of your staff have any questions regarding this Addendum or the Draft EA, please contact Mr. Scott Sjulin, (805) 259-7434.

RUDY M. PONTEMAYOR, P.E.
Environmental Planner

Attachments:
1. Draft EA Text Revisions
2. Figure 2-1 (Original/ Revised)
3. Figure 2-2 (Original/ Revised)
4. Figure 2-3 (Original/ Revised)
5. Distribution List

Draft EA Addendum—Revisions to Text

Table C-1 presents a summary of revisions to the Draft EA and Draft FONSI text, as distributed to public agencies and local libraries on 18 August 2009. Deletions are identified in ~~strikethrough~~, and additions are identified in **bold**. Additional revisions due to the 20 August 2009 final legal description (USAF 2009a), where applicable, are also noted in Table C-1, and such revisions are summarized beginning on Page C-23.

Table C-1 Draft EA Addendum—Revisions to Text

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
Finding of No Significant Impact			
Description of Proposed Alternatives	FONSI-1, Lines 16-17	"…a ~~1.8~~ **1.9**-mile JP-8 pipeline…"	The total pipeline length was revised to 1.9 miles.
Cover Sheet			
Abstract	CS-1, Line 29	"…a ~~1.8~~ **1.9**-mile JP-8 pipeline…"	See previous.
Executive Summary			
Section ES-3.3, *Alternative 1 (Proposed Action)*	ES-2, Lines 18-19	"…approximately ~~33.4~~ **34.9** acres of real estate on Travis AFB…"	The total Alternative 1 outgrant area was revised to approximately 34.9 acres. *Further revised to 32.60 acres (refer to Pg. C-23).*
	ES-2, Lines 27-28	"…**a 1.9-mile belowground pipeline, including** ~~approximately 1.3 miles of~~ **a** 16-inch ~~belowground pipeline~~ **segment**…"	Revised to incorporate changes to the Alternative 1 pipeline layout description.
	ES-2, Lines 29-30	"…~~approximately 0.5 miles of~~ **a** 10-inch ~~belowground pipeline~~ **segment**…"	See previous.
	ES-2, Lines 32-33	"Approximately 1.0 mile of the **16-inch** ~~pipeline~~ **segment**…"	See previous.
Section ES-3.4, *Alternative 2*	ES-3, Line 4	"…approximately ~~33.9~~ **35.5** acres of real estate on Travis AFB…"	The total Alternative 2 outgrant area was revised to approximately 35.5 acres. *Further revised to 35.29 acres (refer to Pg. C-23).*
	ES-3, Line 7	"The ~~1.8-mile~~ Travis Pipeline…"	Revised to incorporate changes to the Alternative 2 pipeline layout description.
Section ES-3.5, *Alternative 3*	ES-3, Line 13	"…approximately ~~33.9~~ **35.5** acres of real estate on Travis AFB…"	The total Alternative 3 outgrant area was revised to approximately 35.5 acres. *Further revised to 35.29 acres (refer to Pg. C-24).*

Table C-1 Draft EA Addendum—Revisions to Text (continued)

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
Executive Summary **(cont'd)**			
Section ES-3.5, *Alternative 3* (cont'd)	ES-3, Line 20	"The remaining ~~0.6~~ **0.7** miles of the pipeline…"	Revised to incorporate changes to the Alternative 3 pipeline layout description.
Section 1, *Purpose and Need for the Proposed Action*			
Section 1.1, *Introduction*	1-1, Line 30	"…a pipeline (*Travis Pipeline*), approximately ~~1.3~~ **1.9 miles in length**…"	The total pipeline length was revised to 1.9 miles.
	1-1, Lines 31-33	"…**including** ~~miles of~~ a 16-inch pipeline…**connecting the proposed junction station and receiving facility**…"	Revised to incorporate changes to the general pipeline layout description.
	1-1, Lines 33-34	"…and ~~approximately 0.5 miles of~~ a 10-inch pipeline…"	See previous.
Section 2, *Description of Alternatives Including the Proposed Action*			
Section 2.5.1, *Components Common to All Proposed Alternatives*	2-11, Line 22	"…**approximately 1.9-mile** Travis Pipeline…"	The total pipeline length was revised to 1.9 miles.
	2-11, Lines 22-23	"…a 10-inch pipeline ~~approximately 0.5 miles~~ **located** along Hangar Avenue…"	Revised to incorporate changes to the general pipeline layout description.
	2-11, Lines 24-26	"…a 16-inch pipeline ~~approximately 1.3 miles in length~~ **located** along an existing decommissioned rail spur…"	See previous.
	2-11, Lines 30-31	"…**length of the 10- and 16-inch pipeline segments**…"	See previous.
Section 2.5.2.1, *Travis Pipeline*	2-18, Line 7	"…the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline…"	Revised to incorporate changes to the Alternative 1 pipeline layout description.
	2-18, Lines 10-11	"**The 16-inch pipeline segment would total approximately 1.3 miles in length.**"	See previous. *Further revised to 1.4 miles in length (refer to Pg. C-27).*
	2-18, Lines 13-14	"**The remaining 0.3 miles would be installed by conventional trenching.**"	Revised to incorporate changes to the Alternative 1 pipeline layout description.
	2-18, Lines 30-31	"…approximately ~~1,720~~ **1,330** feet located between the HDD entry point and the Travis Terminal…"	See previous.
	2-18, Line 33, *and* 2-19, Line 1	"…total disturbance area of approximately ~~3.22~~ **1.53** acres."	Revised to incorporate changes to the Alternative 1 temporary disturbance area acreage. *Further revised to 0.88 acres (refer to Pg. C-28).*

Table C-1 Draft EA Addendum—Revisions to Text (continued)

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
Section 2, *Description of Alternatives Including the Proposed Action* (cont'd)			
Section 2.5.2.1, *Travis Pipeline* (cont'd)	2-19, Line 3	"The ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline…"	Revised to incorporate changes to the Alternative 1 pipeline layout description.
	2-19, Lines 5-6	"**This pipeline segment would total approximately 0.6 miles in length.**"	See previous. *Further revised to 0.5 miles in length (refer to Pg. C-27).*
	2-19, Lines 9-11	"The disturbance area would total approximately ~~3.47~~ **3.56** acres, including approximately ~~2.48~~ **2.51** acres of paved areas and approximately ~~0.99~~ **1.05** acres of unpaved areas."	Revised to incorporate changes to the Alternative 1 temporary disturbance area acreages. *Further revised to 3.03 acres, 1.55 acres, and 1.48 acres (refer to Pg. C-27).*
Section 2.5.2.2, *Real Estate Outgrant Area*	2-20, Lines 2-3	"…approximately ~~33.4~~ **34.9** acres of real estate on the base…"	The total Alternative 1 outgrant area was revised to approximately 34.9 acres. *Further revised to 32.60 acres (refer to Pg. C-23).*
	2-20, Lines 6-7	"…a 75-foot easement located along the centerline of the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline, totaling approximately ~~11.2~~ **11.4** acres…"	Revised to incorporate changes to the Alternative 1 outgrant area description. *Further revised to 12.36 acres (refer to Pg. C-23).*
	2-20, Lines 10-11	"…an area located north of the Travis Terminal footprint, totaling approximately ~~4.0~~ **5.3** acres…"	Revised to incorporate changes to the Alternative 1 outgrant area description. *This part of the outgrant area description was later removed*
	2-20, Lines 12-13	"…a 55- to 75-foot easement located along the centerline of the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline, totaling approximately 2.7 acres…"	Revised to incorporate changes to the Alternative 1 outgrant area description. *Further revised to 2.89 acres (refer to Page C-23).*
Section 2.5.3, *Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques*	2-20, Lines 20-21	"~~Further, construction of the 0.5-mile, 10-inch portion of the Travis Pipeline would remain as described under the Proposed Action.~~"	Revised to incorporate changes to the Alternative 2 pipeline layout description.
	2-20, Line 23	"…the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline…"	See previous.
	2-20, Lines 25-26	"**The 16-inch pipeline segment would total approximately 1.4 miles in length.**"	See previous.
	2-21, Lines 3-4	"…**approximately** ~~1.1~~ **1.2** miles of the 16-inch portion of the Travis Pipeline…"	See previous.

Table C-1 Draft EA Addendum—Revisions to Text (continued)

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
Section 2, *Description of Alternatives Including the Proposed Action* **(cont'd)**			
Section 2.5.3, *Alternative 2 – Pipeline Installation South of the Rail Spur Using Only Slick-Bore and Conventional Trenching Construction Techniques* (cont'd)	2-21, Lines 6-7	"…total disturbance area of approximately ~~9.45~~ **7.26** acres."	Revised to incorporate changes to the Alternative 2 temporary disturbance area acreage. *Further revised to 6.88 acres (refer to Pg. C-30).*
	2-21, Lines 9-16	"**Construction of the 10-inch portion of the Travis Pipeline would remain as described under the Proposed Action. However, this pipeline segment would total approximately 0.5 miles in length under Alternative 2, and temporary disturbance would total approximately 3.04 acres, including approximately 2.37 acres of paved areas and approximately 0.67 acres of unpaved areas. Similar to the Proposed Action, all temporarily disturbed areas under Alternative 2 would be restored to pre-construction condition upon completion of construction activities.**"	Revised to incorporate changes to the Alternative 2 temporary disturbance area acreages. *Further revised to incorporate changes to the description of the 10-inch portion of the Travis Pipeline under all project alternatives (refer to Pg. C-29).*
Section 2.5.3.1, *Real Estate Outgrant Area*	2-21, Lines 29-30	"…approximately ~~33.9~~ **35.5** acres of real estate on the base…"	The total Alternative 2 outgrant area was revised to approximately 35.5 acres. *Further revised to 35.29 acres (refer to Pg. C-23).*
	2-22, Lines 1-2	"…a 75- to 100-foot easement located along the centerline of the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline, totaling approximately 11.7 acres…"	Revised to incorporate changes to the Alternative 2 outgrant area description. *Further revised to a total of 15.05 acres, or 14.56 acres for the aboveground segment and 0.49 acres for the belowground segment (refer to Pg. C-23).*
	2-22, Lines 5-6	"…an area located north of the Travis Terminal footprint, totaling approximately ~~4.0~~ **5.6** acres…"	Revised to incorporate changes to the Alternative 2 outgrant area description. *This part of the outgrant area description was later removed*
	2-22, Lines 7-8	"…a 55- to 75-foot easement located along the centerline of the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline, totaling approximately 2.7 acres…"	Revised to incorporate changes to the Alternative 2 outgrant area description. *Further revised to 2.89 acres (refer to Pg. C-23).*

Table C-1 Draft EA Addendum—Revisions to Text (continued)

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
Section 2, *Description of Alternatives Including the Proposed Action* (cont'd)			
Section 2.5.4, *Alternative 3 – Pipeline Installation Aboveground in the Footprint of the Existing Rail Spur*	2-22, Lines 16-18	"~~Further,~~ Construction of the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline would ~~remain~~ **be the same** as described under ~~the Proposed Action~~ **Alternative 2**."	Revised to incorporate changes to the Alternative 3 pipeline layout description. *Further revised to incorporate additional changes to the description of the 10-inch portion of the Travis Pipeline under all project alternatives (refer to Pg. C-31).*
	2-22, Lines 19-20	"…approximately 1.2 miles of the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline…"	Revised to incorporate changes to the Alternative 3 pipeline layout description.
	2-23, Lines 3-4	"…the remaining ~~0.1 miles~~ **approximately 0.2 miles** of the 16-inch portion of the Travis Pipeline…"	See previous.
	2-23, Line 7	"…a total disturbance area of approximately ~~0.5~~ **1.20** acres."	Revised to incorporate changes to the Alternative 3 temporary disturbance area acreage. *Further revised to 0.53 acres (refer to Pg. C-32).*
Section 2.5.4.1, *Real Estate Outgrant Area*	2-23, Lines 18-19	"…approximately ~~33.9~~ **35.5** acres of real estate on the base…"	The total Alternative 3 outgrant area was revised to approximately 35.5 acres. *Further revised to 35.29 acres (refer to Page C-24).*
	2-23, Lines 22-24	"…a 75- to 100-foot easement located along the centerline of the **aboveground and belowground segments of the** ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline, totaling approximately 11.7 acres…"	Revised to incorporate changes to the Alternative 3 outgrant area description. *Further revised to include descriptions of aboveground and belowground pipeline segment outgrant areas and respective acreages (refer to Page C-24).*
	2-23, Lines 27-28	"…an area located north of the Travis Terminal footprint, totaling approximately ~~4.0~~ **5.6** acres…"	Revised to incorporate changes to the Alternative 3 outgrant area description. *This part of the outgrant area description was later removed*
	2-23, Lines 29-30	"…a 55- to 75-foot easement located along the centerline of the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline, totaling approximately 2.7 acres…"	Revised to incorporate changes to the Alternative 3 outgrant area description. *Further revised to 2.89 acres (refer to Page C-24).*

Table C-1 Draft EA Addendum—Revisions to Text (continued)

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
<u>Section 4, *Environmental Consequences*</u>			
Section 4.5.3.1, *Travis Pipeline*	4-32, Lines 13-14	"…the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline would be installed along the southern edge of the existing rail spur…"	Revised to incorporate changes to the Alternative 1 pipeline layout description.
	4-32, Lines 28-29	"…the remaining **approximately** 0.3 miles of the 16-inch portion of the Travis Pipeline."	See previous.
	4-34, Line 3	"…the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline…"	See previous.
Section 4.5.4.1, *Travis Pipeline*	4-36, Lines 27-28	"…the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline would be installed along the southern edge of the existing rail spur…"	Revised to incorporate changes to the Alternative 2 pipeline layout description.
	4-38, Lines 9-10	"…the remaining ~~1.1~~ **approximately 1.2** miles of the 16-inch portion of the Travis Pipeline…"	See previous.
	4-39, Lines 1-2	"…installation of the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline would be ~~the same as~~ **similar to** the Proposed Action."	Revised to incorporate changes to the Alternative 2 pipeline layout description. *Further revised to incorporate additional changes to the description of the 10-inch portion of the Travis Pipeline under all project alternatives (refer to Pg. C-29).*
Section 4.5.5.1, *Travis Pipeline*	4-41, Lines 6-7	"…approximately 1.2 miles of the ~~1.3-mile,~~ 16-inch portion of the Travis Pipeline would be installed aboveground…"	Revised to incorporate changes to the Alternative 3 pipeline layout description.
	4-41, Lines 29-31	"…the remaining ~~0.1~~ **approximately 0.2** miles of the 16-inch portion of the Travis Pipeline.…"	See previous.
	4-43, Lines 1-3	"Installation of the ~~0.5-mile,~~ 10-inch portion of the Travis Pipeline under Alternative 3 would be the same as **Alternative 2 and similar to** the Proposed Action."	Revised to incorporate changes to the Alternative 3 pipeline layout description. *Further revised to incorporate additional changes to the description of the 10-inch portion of the Travis Pipeline under all project alternatives (refer to Pg. C-31).*

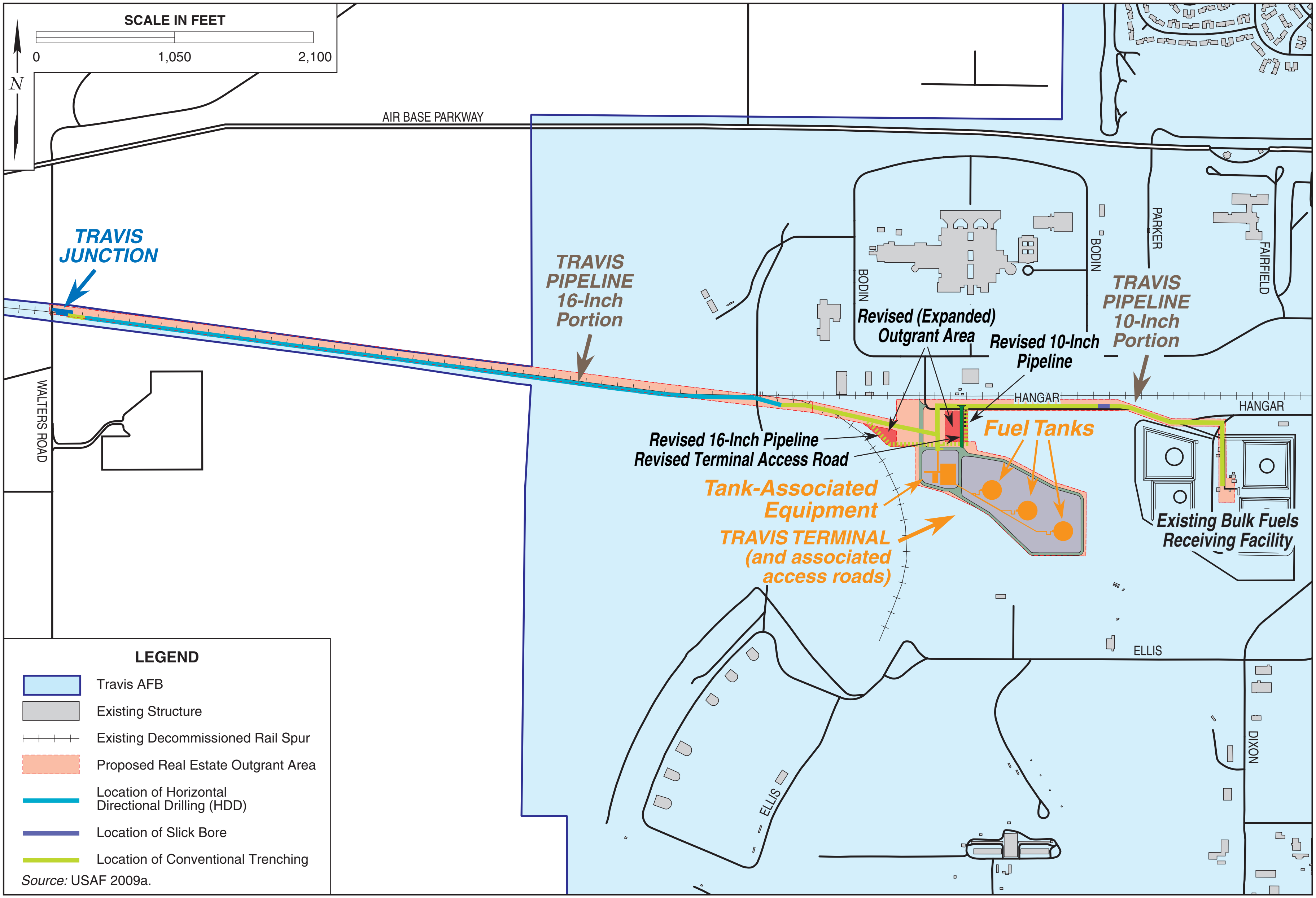
Table C-1 Draft EA Addendum—Revisions to Text (continued)

Draft EA Section	Draft EA Page/Line No.	Revisions	Purpose
<u>Section 7, *References*</u>			
References	7-4, Lines 22-24	"**USAF. 1999. *Travis AFB – Vernal Pool and Endangered Species Mitigation Plan*. Draft Final. Prepared by Sharon K. Collinge, University of Colorado, Boulder, CO, for the 60th CES. July. Travis AFB, CA.**"	Information in this document resulted in changes to the Proposed Action and project alternatives, as described in the Draft EA *Addendum*.

Sources: USAF 1999, 2009a.

Attachment 2 - Revised Figure 2-1

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.
This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



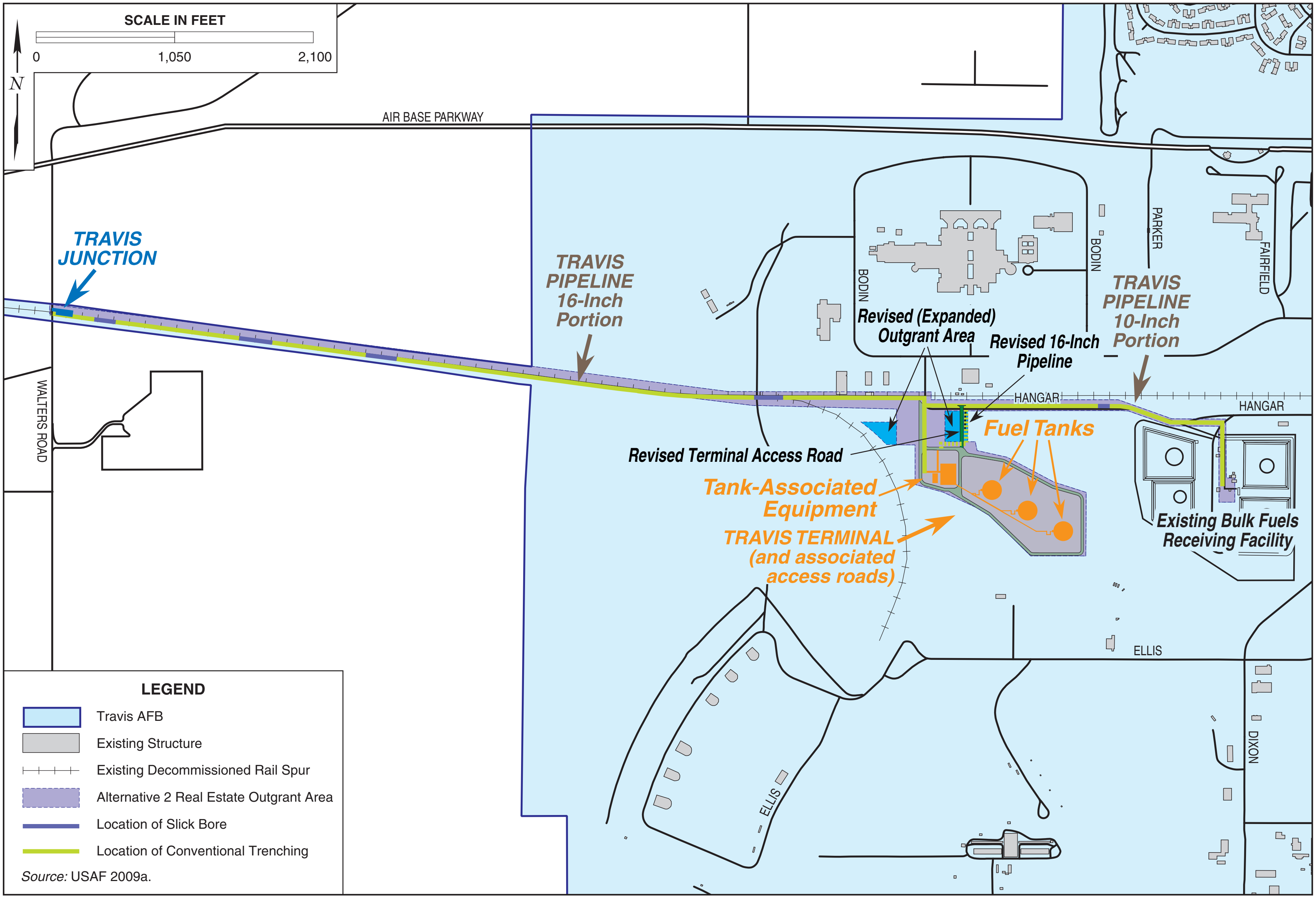
EA

Revised **Travis Pipeline, Location and Construction Techniques under the Proposed Action Travis Air Force Base**

FIGURE 2-1

Attachment 3 - Revised Figure 2-2

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.
This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



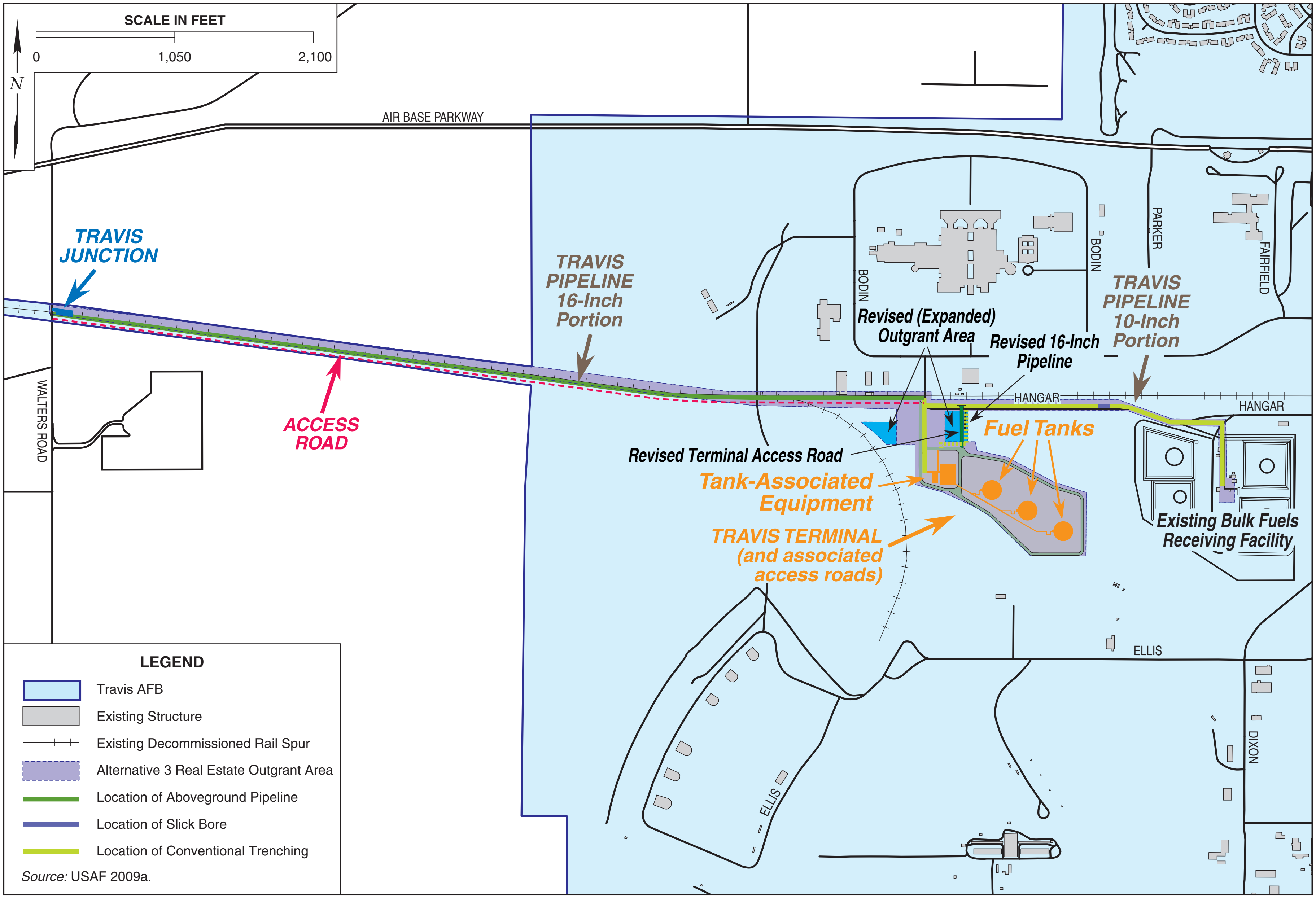
EA

Revised **Travis Pipeline, Location and Construction Techniques under Alternative 2**
Travis Air Force Base

FIGURE 2-2

Attachment 4 - Revised Figure 2-3

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



EA

Revised **Travis Pipeline, Including Location of the Aboveground Portion and Access Road under Alternative 3**
Travis Air Force Base

FIGURE 2-3

Summary of Figure Revisions

Changes described in the Draft EA *Addendum* affected multiple figures in addition to the three revised Draft EA figures distributed on 18 August 2009. Additional figure revisions also resulted from the 20 August 2009 final outgrant area legal description (USAF 2009a) and responses to agency comments. Where applicable, necessary revisions have been incorporated into the figures in the Final EA, and all such revisions are summarized in Table C-2 below.

Table C-2 Summary of Figure Revisions

Figure	Revisions	Purpose
Section 1, *Purpose and Need for the Proposed Action*		
Figure 1-1, *Overview of the Proposed Real Estate Outgrant Area and Location of Proposed Project Components, Travis Air Force Base*	Revised real estate outgrant area for Alternative 1 and Alternatives 2/3. Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	Incorporates changes to the project footprint contained in the Draft EA *Addendum* and additional changes to the real estate outgrant area due to the 20 August 2009 final legal description.
Figure 1-2, *Concord Terminal, Concord-to-Sacramento Pipeline, and Proposed Project Location in the Vicinity of Travis Air Force Base*	No changes.	N/A
Section 2, *Description of Alternatives Including the Proposed Action*		
Figure 2-1, *Travis Pipeline, Location and Construction Techniques under the Proposed Action, Travis Air Force Base*	Revised real estate outgrant area and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend.	Incorporates changes to the project footprint contained in the Draft EA *Addendum* and additional changes to the real estate outgrant area due to the 20 August 2009 final legal description. Also incorporates minor revisions to the legend for reader clarification.
Figure 2-2, *Travis Pipeline, Location and Construction Techniques under Alternative 2, Travis Air Force Base*	See previous.	See previous.
Figure 2-3, *Travis Pipeline, Including Location of the Aboveground Portion and Access Road under Alternative 3, Travis Air Force Base*	See previous.	See previous.

Table C-2 Summary of Figure Revisions (continued)

Figure	Revisions	Purpose
<u>Section 3, *Affected Environment*</u>		
Figure 3-1, *Surface Water Resources in the Vicinity of Travis Air Force Base*	No changes.	N/A
Figure 3-2, *Surface Water Resources and Drainage Areas at Travis Air Force Base*	Revised generic overview of proposed project location.	Incorporates changes to the project footprint contained in the Draft EA *Addendum*.
Figure 3-3, *Wetland Resources at Travis Air Force Base*	See previous.	See previous.
Figure 3-4, *Surface Water Resources and Wetlands in the Vicinity of the Proposed Project Area of Potential Effect (APE)*	Revised combined area of potential effect (APE) for all alternatives. Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	Incorporates changes to the project footprint contained in the Draft EA *Addendum*. Also incorporates minor revisions to the legend for reader clarification.
Figure 3-5, *Known Occurrences of Special-Status Species at or in the Vicinity of Travis Air Force Base, as Cataloged in the California Natural Diversity Database (CNDDB)*	Revised generic overview of proposed project location.	Incorporates changes to the project footprint contained in the Draft EA *Addendum*.
Figure 3-6, *Natural Resource Management Units (NRMUs) and Preservation Areas at Travis Air Force Base*	Revised generic overview of proposed project location. Added preservation areas contained within USAF 1999.	See previous.
Figure 3-7, *Location of Vernal Pools Containing Contra Costa Goldfields in the Vicinity of the Proposed Project Area of Potential Effect (APE)*	Revised combined APE for all alternatives. Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	Incorporates changes to the project footprint contained in the Draft EA *Addendum*. Also incorporates minor revisions to the legend for reader clarification.
Figure 3-8, *Potential Habitat Suitable for Sensitive Vernal Pool Invertebrate in the Vicinity of the Proposed Project Are of Potential Effect (APE)*	See previous.	See previous.
Figure 3-9, *Existing Land Use in the Vicinity of the Proposed Travis Air Force Base Real Estate Outgrant Area*	Revised real estate outgrant area for Alternative 1 and Alternatives 2/3. Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	Incorporates changes to the project footprint contained in the Draft EA *Addendum* and additional changes to the real estate outgrant area due to the 20 August 2009 final legal description. Also incorporates minor revisions to the legend for reader clarification.

Table C-2 Summary of Figure Revisions (continued)

Figure	Revisions	Purpose
<u>Section 3, *Affected Environment*</u> (cont'd)		
Figure 3-10, ~~*Regional and Local Transportation Network and Average Daily Traffic Counts (2006) in Vicinity of Travis Air Force Base*~~ ***Local Transportation Network, Average Daily Traffic (ADT) Counts, and Peak Hour Level of Service (LOS) Ratings in the Vicinity of Travis Air Force Base***	Revised extent of figure to consist of the area immediately in the vicinity of Travis AFB. Added LOS ratings and updated ADT counts. Revised figure title according to edits.	Incorporates responses to a CalTrans comment letter (refer to Appendix B, Table B-2).
Figure 3-11, *Identified Environmental Restoration Program (ERP) Sites at Travis Air Force Base*	Revised generic overview of proposed project location.	Incorporates changes to the project footprint contained in the Draft EA *Addendum*.
Figure 3-12, *Surface Soils in the vicinity of the Proposed Project Area of Potential Effect (APE)*	Revised combined APE for all alternatives. Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	Incorporates changes to the project footprint contained in the Draft EA *Addendum*. Also incorporates minor revisions to the legend for reader clarification.
<u>Section 4, *Environmental Consequences*</u>		
Figure 4-1, *Notable Surface Water Resources and Wetlands in the Vicinity of the Proposed Project Area of Potential Effect (APE)*	See previous.	See previous.
Figure 4-2, *Travis Pipeline, Construction Techniques and Temporary ~~Impact~~* ***Disturbance*** *Areas under the Proposed Action, and Notable Surface Water Resources and Wetlands*	Revised Alternative 1 temporary disturbance areas and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend. Revised figure title.	See previous.
Figure 4-3, *Travis Pipeline, Construction Techniques and Temporary ~~Impact~~* ***Disturbance*** *Areas under Alternative 2, and Notable Surface Water Resources and Wetlands*	Revised Alternative 2 temporary disturbance areas and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend. Revised figure title.	See previous.
Figure 4-4, *Travis Pipeline, Construction Techniques, Temporary ~~Impact~~* ***Disturbance*** *Areas, and Access Road under Alternative 3, and Notable Surface Water Resources and Wetlands*	Revised Alternative 3 temporary disturbance areas and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend. Revised figure title.	See previous.

Table C-2 Summary of Figure Revisions (continued)

Figure	Revisions	Purpose
<u>Section 4, *Environmental Consequences*</u> (cont'd)		
Figure 4-5, *Notable Habitat Areas in the Vicinity of the Proposed Project Area of Potential Effect (APE)*	Revised combined APE for all alternatives. Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	See previous.
Figure 4-6, *Travis Pipeline, Construction Techniques and Temporary ~~Impact~~ **Disturbance** Areas under the Proposed Action, and Notable Habitat Areas*	Revised Alternative 1 temporary disturbance areas and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend. Revised figure title.	See previous.
Figure 4-7, *Travis Pipeline, Construction Techniques and Temporary ~~Impact~~ **Disturbance** Areas under Alternative 2, and Notable Habitat Areas*	Revised Alternative 2 temporary disturbance areas and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend. Revised figure title.	See previous.
Figure 4-8, *Travis Pipeline, Construction Techniques, Temporary ~~Impact~~ **Disturbance** Areas, and Access Road under Alternative 3, and Notable Habitat Areas*	Revised Alternative 3 temporary disturbance areas and pipeline footprint. Added new construction technique for pipeline segment crossing Union Creek. Minor edits to the Legend. Revised figure title.	See previous.
Figure 4-9, *Environmental Restoration Program (ERP) Site LF044 and Location of Proposed Travis Terminal*	Revised generic pipeline footprint for Alternative 1 and Alternatives 2/3.	See previous.

Sources: Solano County 2008; USAF 1999, 2009a.

Final Legal Description of the Proposed Real Estate Outgrant Areas

Tables C-3 to C-6 present proposed real estate outgrant area acreages for the Proposed Action, Alternative 2, and Alternative 3, as well as the *composite outgrant area*, or composite of real estate outgrant areas for all project alternatives. Final EA outgrant area acreages are based on the final legal description submitted to the USAF on 20 August 2009 (USAF 2009a). Draft EA and Draft EA *Addendum* acreages are also noted below. Deletions are identified in ~~strikethrough~~, and additions are identified in **bold**.

Table C-3 Real Estate Outgrant Area, Alternative 1 (Proposed Action)

Outgrant Area Component, Alternative 1 (Proposed Action)	**Original Draft EA (acres)**	**Draft EA *Addendum* (acres)**	**Final Legal Description (acres)**
16-Inch Pipeline (including Travis Junction)	~~11.2~~	**~~11.4~~**	**12.36**
Travis Terminal Footprint **(+ adjacent areas)**	15.5	~~15.5~~	**16.21**
~~Area North of Travis Terminal Footprint~~	~~4.0~~	**~~5.3~~**	**Omitted**
10-Inch Pipeline	2.7	~~2.7~~	**2.89**
Area in Existing Bulk Fuels Receiving Facility	N/S	N/S	**1.14**
TOTAL OUTGRANT AREA	~~33.4~~	**~~34.9~~**	**32.60**

N/S = not specified.
Source: USAF 2009a.

Table C-4 Real Estate Outgrant Area, Alternative 2

Outgrant Area Component, Alternative 2	**Original Draft EA (acres)**	**Draft EA *Addendum* (acres)**	**Final Legal Description (acres)**
16-Inch Pipeline (including Travis Junction)	~~11.2~~	**~~11.7~~**	**15.05**
Travis Terminal Footprint **(+ adjacent areas)**	15.5	~~15.5~~	**16.21**
~~Area North of Travis Terminal Footprint~~	~~4.0~~	**~~5.6~~**	**Omitted**
10-Inch Pipeline	2.7	~~2.7~~	**2.89**
Area in Existing Bulk Fuels Receiving Facility	N/S	N/S	**1.14**
TOTAL OUTGRANT AREA	~~33.4~~	**~~35.5~~**	**35.29**

N/S = not specified.
Source: USAF 2009a.

Table C-5 Real Estate Outgrant Area, Alternative 3

Outgrant Area Component, Alternative 3	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final Legal Description (acres)
~~16-Inch Pipeline (including Travis Junction)~~	~~11.2~~	**~~11.7~~**	**Omitted**
Aboveground Segment of 16-Inch Pipeline (including Travis Junction)	N/S	N/S	**14.56**
Belowground Segment of 16-Inch Pipeline	N/S	N/S	**0.49**
Travis Terminal Footprint **(+ adjacent areas)**	15.5	~~15.5~~	**16.21**
~~Area North of Travis Terminal Footprint~~	~~4.0~~	**~~5.6~~**	**Omitted**
10-Inch Pipeline	2.7	~~2.7~~	**2.89**
Area in Existing Bulk Fuels Receiving Facility	N/S	N/S	**1.14**
TOTAL OUTGRANT AREA	~~33.4~~	**~~35.5~~**	**35.29**

N/S = not specified.
Source: USAF 2009a.

Table C-6 Composite Real Estate Outgrant Area

Composite Real Estate Outgrant Area	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final Legal Description (acres)
TOTAL COMPOSITE OUTGRANT AREA	N/S	~~N/S~~	**40.21**

N/S = not specified.
Source: USAF 2009a.

Revised Project Description—Components Common to All Proposed Alternatives

Tables C-7 to C-10 present temporary disturbance and permanent footprints associated with components common to all project alternatives, including the Travis Terminal, Travis Junction, and Temporary Staging Areas, as well as the *area of potential effect* (APE), or composite of temporary disturbance and permanent footprints associated with all project alternatives. Draft EA, Draft EA *Addendum*, and Final EA acreages are noted below. Deletions are identified in ~~strikethrough~~, and additions are identified in **bold**.

Table C-7 Travis Terminal, Project Footprint and Additional Temporary Disturbance Areas

Travis Terminal Project Components	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Project Footprint			
Storage Tanks and Associated Equipment	11.31	11.31	11.31
Access Road	2.13	~~2.13~~	**2.03**
PROJECT FOOTPRINT SUBTOTAL	13.44	~~13.44~~	**13.34**
Additional Temporary Disturbance Areas			
Terminal Perimeter	0.77	~~0.77~~	**0.72**
TEMPORARY DISTURBANCE SUBTOTAL	0.77	~~0.77~~	**0.72**
TOTAL FOOTPRINT AND DISTURBANCE	14.21	~~14.21~~	**14.06**

Table C-8 Travis Junction, Project Footprint and Additional Temporary Disturbance Areas

Travis Junction Project Components	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Project Footprint			
Surface Waters (South Ditch)	0.017	0.017	0.017
Other Areas (Previously Disturbed)	0.17	~~0.17~~	**0.15**
PROJECT FOOTPRINT SUBTOTAL	0.17	0.17	0.17
Additional Temporary Disturbance Areas			
Surface Waters (North Ditch)	0.054	~~0.054~~	**0.017**
Other Areas (Previously Disturbed)	0.11	~~0.11~~	**0.10**
TEMPORARY DISTURBANCE SUBTOTAL	0.11	~~0.11~~	**0.12**
TOTAL DISTURBANCE	0.28	~~0.28~~	**0.29**

Table C-9 Temporary Staging Areas

Temporary Staging Areas	**Original Draft EA (acres)**	**Draft EA *Addendum* (acres)**	**Final EA (acres)**
Staging Area near Walters Road	0.60	~~0.60~~	**0.64**
~~Staging Area near Travis Terminal Footprint~~	~~1.30~~	**Omitted**	Omitted
Revised Staging Area near Travis Terminal Footprint	N/S	~~**1.30**~~	**1.81**
TOTAL TEMPORARY STAGING AREAS	~~1.90~~	~~1.90~~	**2.45**

N/S = not specified.

Table C-10 Area of Potential Effect (APE)

Area of Potential Effect (APE)	**Original Draft EA (acres)**	**Draft EA *Addendum* (acres)**	**Final EA (acres)**
TOTAL APE	36.80	~~36.80~~	**38.29**

Revised Project Description—Travis Pipeline, Alternative 1 (Proposed Action)

Tables C-11 to C-14 summarize information on the Travis Pipeline component of Alternative 1, the Proposed Action, including lengths of the 10-inch and 16-inch pipeline segments, and disturbance areas associated with pipeline construction. It should be noted that, in the Final EA, the length of the 10-inch pipeline segment and disturbance areas associated with construction of this segment are the same for all project alternatives. However, this information originally varied by project alternative and is accordingly presented below and for Alternatives 2 and 3. Pipeline segment lengths and disturbance areas are presented below for the Draft EA, Draft EA *Addendum*, and the Final EA. Deletions are identified in ~~strikethrough~~, and additions are identified in **bold**.

Table C-11 Travis Pipeline, Pipeline Segment Length and Construction Techniques, Alternative 1 (Proposed Action)

Travis Pipeline Segment and Construction Techniques	Original Draft EA (mi)	Draft EA *Addendum* (mi)	Final EA (mi)
10-Inch Pipeline Segment			
Conventional Trenching	~~0.5~~	~~**0.6**~~	**0.5**
Slick-Bore or Attachment to Existing Bridge[1]	75 feet	75 feet	75 feet
10-INCH SUBTOTAL	~~0.5~~	~~**0.6**~~	**0.5**
16-Inch Pipeline Segment			
Horizontal Directional Drilling (HDD)	~~1.1~~	~~**1.0**~~	**1.1**
Conventional Trenching	~~0.2~~	**0.3**	0.3
16-INCH SUBTOTAL	1.3	~~1.3~~	**1.4**
TOTAL PIPELINE LENGTH	~~1.8~~	**1.9**	1.9

[1] – portion crossing channelized west branch of Union Creek.

Table C-12 Travis Pipeline, 10-Inch Segment, Temporary Disturbance Areas, Alternative 1 (Proposed Action)

10-Inch Segment Construction Techniques	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Conventional Trenching			
Paved Areas (Previously Disturbed)	~~2.48~~	~~**2.51**~~	**1.55**
Other Areas (Previously Disturbed)	~~0.99~~	~~**1.05**~~	**1.48**
CONVENTIONAL TRENCHING SUBTOTAL	~~3.47~~	~~**3.56**~~	**3.03**
TOTAL TEMPORARY DISTURBANCE	~~3.47~~	~~**3.56**~~	**3.03**

Table C-13 Travis Pipeline, 16-Inch Segment, Temporary Disturbance Areas, Alternative 1 (Proposed Action)

16-Inch Segment Construction Techniques	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
HDD Pipeline Excavation Segment			
No Surface Disturbance[1]	None	None	None
HDD EXCAVATION SUBTOTAL	None	None	None
HDD Entry Point			
Other Areas (Previously Disturbed)	0.68	0.68	0.68
HDD ENTRY SUBTOTAL	0.68	0.68	0.68
HDD Exit Point			
Surface Waters (North Ditch)	0.021	0.021	0.021
Surface Waters (South Ditch)	0.017	0.017	0.017
Other Areas (Previously Disturbed)	0.17	~~0.17~~	**0.21**
HDD EXIT SUBTOTAL	0.21	~~0.21~~	**0.25**
HDD Pipeline Assembly Area			
Other Areas (Previously Disturbed)	5.17	~~5.17~~	**2.42**
PIPELINE ASSEMBLY SUBTOTAL	5.17	~~5.17~~	**2.42**
Conventional Trenching			
Other Areas (Previously Disturbed)	~~3.22~~	~~**1.53**~~	**0.88**
CONVENTIONAL TRENCHING SUBTOTAL	~~3.22~~	~~**1.53**~~	**0.88**
TOTAL TEMPORARY DISTURBANCE	~~9.29~~	~~**7.60**~~	**4.23**

[1] – all excavation would occur at least 42 inches below ground surface (bgs).

Table C-14 Travis Pipeline, Summary of Temporary Disturbance Areas, Alternative 1 (Proposed Action)

Travis Pipeline Segment	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
10-INCH TEMPORARY DISTURBANCE	~~3.47~~	~~**3.56**~~	**3.03**
16-INCH TEMPORARY DISTURBANCE	~~9.29~~	~~**7.60**~~	**4.23**
TOTAL TEMPORARY DISTURBANCE	~~12.76~~	~~**11.16**~~	**7.26**

Revised Project Description—Travis Pipeline, Alternative 2

Tables C-15 to C-18 summarize information on the Travis Pipeline component of Alternative 2, including lengths of the 10-inch and 16-inch pipeline segments, and disturbance areas associated with pipeline construction. As previously noted, in the Final EA, the length of the 10-inch pipeline segment and disturbance areas associated with construction of this segment are the same for all project alternatives, but originally varied by project alternative. Pipeline segment lengths and disturbance areas are presented below for the Draft EA, Draft EA *Addendum*, and the Final EA. Deletions are identified in ~~strikethrough~~, and additions are identified in **bold**.

Table C-15 Travis Pipeline, Pipeline Segment Length and Construction Techniques, Alternative 2

Travis Pipeline Segment and Construction Techniques	Original Draft EA (mi)	Draft EA *Addendum* (mi)	Final EA (mi)
10-Inch Pipeline Segment			
Conventional Trenching	0.5	0.5	0.5
Slick-Bore or Attachment to Existing Bridge[1]	75 feet	75 feet	75 feet
10-INCH SUBTOTAL	0.5	0.5	0.5
16-Inch Pipeline Segment			
Slick-Bore	0.2	0.2	0.2
Conventional Trenching	~~1.1~~	**1.2**	1.2
16-INCH SUBTOTAL	~~1.3~~	**1.4**	1.4
TOTAL PIPELINE LENGTH	~~1.8~~	**1.9**	1.9

[1] – portion crossing channelized west branch of Union Creek.

Table C-16 Travis Pipeline, 10-Inch Segment, Temporary Disturbance Areas, Alternative 2

10-Inch Segment Construction Techniques	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Conventional Trenching			
Paved Areas (Previously Disturbed)	~~2.48~~	~~**2.37**~~	**1.55**
Other Areas (Previously Disturbed)	~~0.99~~	~~**0.67**~~	**1.48**
CONVENTIONAL TRENCHING SUBTOTAL	~~3.47~~	~~**3.04**~~	**3.03**
TOTAL TEMPORARY DISTURBANCE	~~3.47~~	~~**3.04**~~	**3.03**

Table C-17 Travis Pipeline, 16-Inch Segment, Temporary Disturbance Areas, Alternative 2

16-Inch Segment Construction Techniques	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Slick-Bore			
No Surface Disturbance[1]	None	None	None
SLICK-BORE SUBTOTAL	None	None	None
Conventional Trenching			
~~Surface Waters (North Ditch)~~	0.021	~~0.021~~	**Omitted**
Surface Waters (South Ditch)	0.34	~~0.34~~	**0.33**
Paved Areas (Previously Disturbed)	N/S	~~N/S~~	**0.05**
Other Areas (Previously Disturbed)	~~9.09~~	~~**6.90**~~	**6.50**
CONVENTIONAL TRENCHING SUBTOTAL	~~9.45~~	~~**7.26**~~	**6.88**
TOTAL TEMPORARY DISTURBANCE	~~9.45~~	~~**7.26**~~	**6.88**

[1] – all excavation would occur at least 42 inches bgs.
N/S = not specified.

Table C-18 Travis Pipeline, Summary of Temporary Disturbance Areas, Alternative 2

Travis Pipeline Segment	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
10-INCH TEMPORARY DISTURBANCE	~~3.47~~	~~**3.04**~~	**3.03**
16-INCH TEMPORARY DISTURBANCE	~~9.45~~	~~**7.26**~~	**6.88**
TOTAL TEMPORARY DISTURBANCE	~~12.92~~	~~**10.82**~~	**9.91**

Revised Project Description—Travis Pipeline, Alternative 3

Tables C-19 to C-22 summarize information on the Travis Pipeline component of Alternative 3, including lengths of the 10-inch and 16-inch pipeline segments, and temporary disturbance and permanent footprint areas associated with pipeline construction. As previously noted, in the Final EA, the length of the 10-inch pipeline segment and construction-related disturbance areas are the same for all project alternatives, but originally varied by project alternative. Pipeline segment lengths and disturbance areas are presented below for the Draft EA, Draft EA *Addendum*, and the Final EA. Deletions are identified in ~~strikethrough~~, and additions are identified in **bold**.

Table C-19 Travis Pipeline, Pipeline Segment Length and Construction Techniques, Alternative 3

Travis Pipeline Segment and Construction Techniques	Original Draft EA (mi)	Draft EA *Addendum* (mi)	Final EA (mi)
10-Inch Pipeline Segment			
Conventional Trenching	0.5	0.5	0.5
Slick-Bore or Attachment to Existing Bridge[1]	75 feet	75 feet	75 feet
10-INCH SUBTOTAL	0.5	0.5	0.5
16-Inch Pipeline Segment			
Aboveground	1.2	1.2	1.2
Belowground (Conventional Trenching)	~~0.1~~	**0.2**	0.2
16-INCH SUBTOTAL	~~1.3~~	**1.4**	1.4
TOTAL PIPELINE LENGTH	~~1.8~~	**1.9**	1.9

[1] – portion crossing channelized west branch of Union Creek.

Table C-20 Travis Pipeline, 10-Inch Segment, Temporary Disturbance Areas, Alternative 3

10-Inch Segment Construction Techniques	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Conventional Trenching			
Paved Areas (Previously Disturbed)	~~2.48~~	~~**2.37**~~	**1.55**
Other Areas (Previously Disturbed)	~~0.99~~	~~**0.67**~~	**1.48**
CONVENTIONAL TRENCHING SUBTOTAL	~~3.47~~	~~**3.04**~~	**3.03**
TOTAL TEMPORARY DISTURBANCE	~~3.47~~	~~**3.04**~~	**3.03**

Table C-21 Travis Pipeline, 16-Inch Segment, Temporary Disturbance and Permanent Footprint Areas, Alternative 3

16-Inch Segment Construction Techniques	Original Draft EA (acres)	Draft EA *Addendum* (acres)	Final EA (acres)
Aboveground Pipeline			
Surface Waters Containing Contra Costa Goldfields (*Lasthenia conjugens*)[1]	N/S	~~N/S~~	**0.088**
Surface Waters (North Ditch)[2]	N/S	~~N/S~~	**0.74**
Surface Waters (South Ditch)[3]	0.90	~~0.90~~	**0.97**
Other Areas (Previously Disturbed)[4]	N/S	~~N/S~~	**5.89**
ABOVEGROUND SUBTOTAL[5]	N/S	~~N/S~~	**7.60**
Conventional Trenching			
Total Temporary Disturbance Footprint[6]	~~0.50~~	~~**1.20**~~	**Omitted**
Paved Areas (Previously Disturbed)	N/S	~~N/S~~	**0.27**
Other Areas (Previously Disturbed)	N/S	~~N/S~~	**0.26**
CONVENTIONAL TRENCHING SUBTOTAL	~~0.50~~	~~**1.20**~~	**0.53**
TOTAL TEMPORARY DISTURBANCE	N/S	~~N/S~~	**8.13**
Aboveground Pipeline Footprint			
Other Areas (Previously Disturbed)	N/S	~~N/S~~	**3.54**
FOOTPRINT SUBTOTAL	N/S	~~N/S~~	**3.54**
Conventional Pipeline Access Road			
Surface Waters Containing Contra Costa Goldfields[7]	0.06	~~0.06~~	**0.093**
Surface Waters (South Ditch)[8]	0.37	~~0.37~~	**0.28**
Other Areas (Previously Disturbed)	2.52	~~2.52~~	**3.02**
ACCESS ROAD SUBTOTAL[9]	2.89	~~2.89~~	**3.30**
TOTAL PERMANENT FOOTPRINT	N/S	~~N/S~~	**6.83**
COMBINED TEMPORARY DISTURBANCE AND PERMANENT FOOTPRINT	N/S	~~N/S~~	**14.96**

[1] – Final EA calculation is comprised of approximately 0.011 and 0.077 acres of Contra Costa goldfields respectively located in the North and South Ditches.
[2] – Final EA calculation includes approximately 0.11 acres of Contra Costa goldfields located in the North Ditch.
[3] – Final EA calculation includes approximately 0.77 acres of Contra Costa goldfields located in the South Ditch.
[4] – Final EA calculation is comprised of temporary disturbance areas only and excludes areas located in the permanent Travis Pipeline footprint.
[5] – total of Surface Waters (North Ditch), Surface Waters (South Ditch), and Other Areas (Previously Disturbed).
[6] – Draft EA and Draft EA *Addendum* calculations did not specify the amount of paved and other areas in the footprint.
[7] – all calculations reflect the amount of Contra Costa goldfields located in the South Ditch.
[8] – all calculations include the amount of Contra Costa goldfields located in the South Ditch.
[9] – total of Surface Waters (South Ditch) and Other Areas (Previously Disturbed).
N/S = not specified.

Table C-22 Travis Pipeline, Summary of Temporary Disturbance and Permanent Footprint Areas, Alternative 3

Travis Pipeline Segment	**Original Draft EA (acres)**	**Draft EA *Addendum* (acres)**	**Final EA (acres)**
10-INCH TEMPORARY DISTURBANCE	~~3.47~~	~~**3.04**~~	**3.03**
16-INCH TEMPORARY DISTURBANCE[1]	~~0.50~~	~~1.20~~	**8.13**
16-INCH PERMANENT FOOTPRINT[2]	2.89	~~2.89~~	**6.83**
TOTAL TEMPORARY DISTURBANCE[3]	N/S	~~N/S~~	**17.99**

[1] – Draft EA and Draft EA *Addendum* calculations omit temporary disturbance associated with the aboveground pipeline segment.
[2] – Draft EA and Draft EA *Addendum* calculations omit the permanent footprint associated with the aboveground pipeline footprint.
[3] – Draft EA and Draft EA *Addendum* calculations omitted due to incomplete information noted in (1) and (2).

APPENDIX D

PUBLIC INVOLVEMENT

Appendix D
Public Involvement

The USAF *Environmental Impact Analysis Process* (32 CFR § 989) states that EA and FONSI documents should be made available to agencies under the IICEP (refer to Appendix B) and to the public for comment.

A *NOA* announcing the 30-day public comment period and the availability of the Draft EA and Draft FONSI was published in two local newspapers on 12 August 2009 and again on 26 August 2009. Copies of the Draft EA and Draft FONSI were sent to Federal, state, and local agencies (refer to Appendix B, Table B-1). Additionally, copies of the Draft EA and Draft FONSI were placed in four local libraries for public review. The names of the newspapers and libraries are listed in Table D-1 below.

On 18 August 2009, the Draft EA *Addendum* letter, summary of revisions to the Draft EA and Draft FONSI text, and three revised Draft EA figures were distributed to the agencies on the IICEP Distribution List (refer to Appendix B, Table B-1) and to the four local libraries listed in Table D-1.

Table D-1 Local Newspapers and Libraries Notified as Part of the IICEP Process

Newspapers	
The Daily Republic Fairfield, California	*The Vacaville Reporter* Vacaville, California
Libraries	
Fairfield-Suisun Community Library 1150 Kentucky Avenue Fairfield, CA 94533	Vacaville Public Library 1020 Ulatis Drive Vacaville, CA 95687
Suisun City Library 601 Pintail Drive Suisun City, CA 94585	Mitchell Memorial Library 510 Travis Avenue (Bldg. 436) Travis AFB, CA 94535

APPENDIX E

STATE HISTORIC PRESERVATION OFFICE (SHPO) CONSULTATION

Appendix E
State Historic Preservation Office (SHPO) Consultation

On 28 August 2009, the USAF submitted a *Determination and Request for Concurrence* for a finding of "No Historic Properties Affected" (36 CFR § 800.4[d][2]) to the California SHPO. The letter and associated figure submitted to the SHPO are contained in this appendix (refer to pages E-3 to E-9).

On 29 October 2009, the California SHPO submitted a letter to the USAF stating that it *concurred* with USAF's finding of "No Historic Properties Affected" (SHPO 2009) (refer to page E-11). Refer to Section 3.8, *Cultural Resources*, for information on cultural resources at Travis AFB, including in the vicinity of the proposed project APE, as well as previous cultural resources evaluations in these areas. Refer to Section 4.8, *Cultural Resources*, for analysis of potential impacts to cultural resources as a result of implementation of the Proposed Action, Alternative 2, or Alternative 3.

DEPARTMENT OF THE AIR FORCE
60TH CIVIL ENGINEER SQUADRON (AMC)

28 AUG 2009

Mr. David H. Musselwhite
60 CES/CEA
411 Airmen Dr
Travis AFB CA 94535-2001

Milford Wayne Donaldson
State Historic Preservation Officer
California Office of Historic Preservation
P.O. Box 942896
Sacramento CA 94296-0001

Dear Mr. Donaldson

As the Acting Cultural Resources Manager for Travis AFB, and in accordance with paragraph 4.3.2.2 of the Travis AFB Integrated Cultural Resources Management Plan (ICRMP), I have determined that there is no potential for this project to have an effect on historic property.

An Environmental Assessment (EA) have been prepared to address the potential environmental impacts associated with the outgrant of approximately 32.6 acres of real estate on Travis AFB to SFPP, L.P. (SFPP), upon which SFPP would install, own, operate, and maintain a jet fuel (JP-8) pipeline, receiving facility, and associated ancillary equipment. The proposed real estate outgrant and construction project would enhance the existing Travis AFB JP-8 distribution and dispensation infrastructure for its Air Mobility Command (AMC) missions. The EA evaluates a Proposed Action, two project alternatives, and a No-Action Alternative.

The Area of Potential Effect (APE) for this project includes the proposed real estate outgrant area, plus additional adjacent areas which may potentially be utilized during project construction. The APE was revised on 18 August 2009 to address slight changes to the construction footprints of the Proposed Action and two project alternatives (Attachment 1).

Project Description:

The purpose of the project is to enhance the existing Travis AFB JP-8 distribution and dispensation infrastructure for its AMC missions, improve the base's fuel distribution network and capacity, and increase the base's access to SFPP's recently modernized fuel distribution network. The project is comprised of the outgrant of real estate to SFPP for the purposes of SFPP installing, owning, operating, and maintaining a JP-8 pipeline, receiving facility, and associated ancillary equipment, including:

- a junction station, located at the western edge of Travis AFB, to access an SFPP-owned and operated multi-product petroleum pipeline which runs from Concord to Sacramento;

- an on-base JP-8 pipeline, approximately 1.9 miles in length, that would be placed within an existing decommissioned railroad spur alignment (constructed in 1943 and determined not eligible during the 1995 base-wide survey) after the tracks and ties were removed. The pipeline would be constructed belowground under the Proposed Action and one project alternative, and a combination of belowground and aboveground under a second project alternative; and,

- an on-base JP-8 receiving facility, located west of the existing Travis AFB Bulk Fuels Receiving Facility, with three 150,000-barrel aboveground JP-8 storage tanks, tank-associated secondary containment areas, additional ancillary equipment, and access roads.

Existing Cultural Resources and Area of Potential Effect (APE):

Identification of cultural resources potentially impacted by the Proposed Action was accomplished by reviewing the 2003 Travis AFB ICRMP Update (United States Air Force [USAF] 2003) and conducting a records search at the California Historical Resource Information System (CHRIS) North Coast Information Center at Sonoma State University in Rohnert Park, CA. Three cultural resources investigations were conducted within the APE, as identified in Table 1. Three additional cultural resources investigations were conducted within 0.25 miles of the APE, as identified in Table 2.

Prehistoric Archeological Resources:

The Travis AFB ICRMP Update (USAF 2003) identified ten archaeological sites on the base. The sites consisted of three prehistoric archaeological sites and seven historical archaeological sites. None of the seven historical archaeological sites are eligible for the National Register of Historic Places (NRHP) and none require further investigation. Two prehistoric sites that are within 0.25 miles of the APE were identified during an intensive pedestrian survey where the David Grant Medical Center (DGMC) now stands: CA-SOL-313 and CA-SOL-314 (Flynn & Roop 1984) (Table 3).

Table 1. Cultural Resources Investigations Conducted within the APE

Year	Author	Report Title	Findings
1989	HQ AMC	*Cultural Resources Assessment*	Recommendations made for survey efforts needed to complete Section 110 identification requirements. Provided the basis for designating areas with the potential to contain intact cultural resources.
1995	HQ AMC	*Travis AFB, California: Inventory of Cold War Properties.* Survey selected 51 buildings for evaluation based on their Cold War role.	The report recommended 34 properties as eligible for the NRHP.
1995	HQ AMC	*An Archaeological and Historic Resources Study and Inventory of Travis Air Force Base, Solano and Contra Costa Counties, California.*	0 prehistoric sites identified. 6 historical archeological sites identified, none of which are eligible for the NRHP. Inventoried all WWII-era permanent structures. Prepared state inventory forms for those structures.
2003	USAF	*Travis AFB – Integrated Cultural Resources Management Plan (ICRMP)*	A multi-year plan for the management of cultural resources at Travis AFB (currently under revision).

Table 2. Cultural Resources Investigations Conducted within 0.25 miles of the APE

Year	Author	Report Title	Findings
1984	Flynn & Roop	*Section 106 Survey for a Proposed Medical Facility (100 acres)*	Two prehistoric sites recorded on base. Site CA-SOL-313 was NRHP-eligible. Later subjected to data recovery.
1989	Roop et. al.	*Data Recovery Mitigation of CA-SOL-313 for Proposed Medical Facility*	One prehistoric lithic scatter recorded.

Table 3. Prehistoric Archaeological Resources Located within 0.25 miles of the APE

Site Number	Type of Site	Site Information	NRHP eligibility
CA-SOL-313	Lithic site	Unknown occupational period	Documented in 1984, site CA-SOL-313 was NRHP eligible. Subjected to data recovery due to proposed construction of DGMC.
CA-SOL-314	Lithic site	Unknown occupational period	Documented in 1984, the site was determined Ineligible for the NRHP, and was destroyed during the construction of DGMC.

Historic Archaeological Resources:

Travis AFB contracted with Argonne National Laboratories to conduct a comprehensive survey of Travis AFB in compliance with Section 110 of NHPA (USAF Headquarters/AMC [HQ AMC] 1995). The field team surveyed all undisturbed portions of Travis AFB. Five historical archeological sites were identified during the survey.

One historic farmstead site, TAFB-H-02, is located within the proposed project APE near the site of the proposed Travis Tank Farm (reference confidential Figure 6.1 of the ICRMP). Another historic homestead, TAFB-H-03, is located within 0.25 miles of the APE (reference confidential Figure 6.1 of the ICRMP). Data recovered from these two identified historic sites indicated that none met NRHP evaluation criteria for eligibility. No further work is recommended at these locations (HQ AMC 1995).

Table 4. Historic Archaeological Resources Located within the APE

Site Number	Type of Site	Site Information	NRHP Eligibility
TAFB-H-02	Historic Farmstead	Early 19th century farmstead. Documented in 1996 during HQ AMC, Section 110 basewide Cultural Resources Inventory. Survey included a total of 957 acres.	Ineligible

Table 5. Historic Archaeological Resources Located within 0.25 Miles of the APE

Site Number	Type of Site	Site Information	NRHP Eligibility
TAFB-H-03	Historic Farmstead	Early 19th century farmstead. Documented in 1996 during HQ AMC, Section 110 basewide Cultural Resources Inventory. Survey included a total of 957 acres.	Ineligible

Historic Buildings and Structures:

Recommendations of the World War II inventory and evaluation of 42 buildings and structures (HQ AMC 1995) concluded that none of the buildings have strong association with significant events or persons, none are architecturally significant; and none retain sufficient integrity for inclusion in the NRHP. The SHPO has concurred with this determination (HQ AMC 1995).

Table 6. Historic Buildings Located within 0.25 Miles of the APE

Site Number	Type of Site	Site Information	NRHP Eligibility
Bldg. 810	Cold War-era Hanger	Double-cantilever, B-36 Bomber Hangar constructed in 1952 by Kuljian Corporation	Eligible

Cultural Resources Impacts:

Construction and Operations Related Impacts: As indicated above, no existing archaeological sites occur within the APE. Construction and operations-related impacts would occur in areas previously disturbed by construction. No buildings or structures would be demolished or altered. The APE has been previously subject to an archaeological survey. No NRHP-eligible resources have been identified; therefore, the proposed project would result in no historic properties affected.

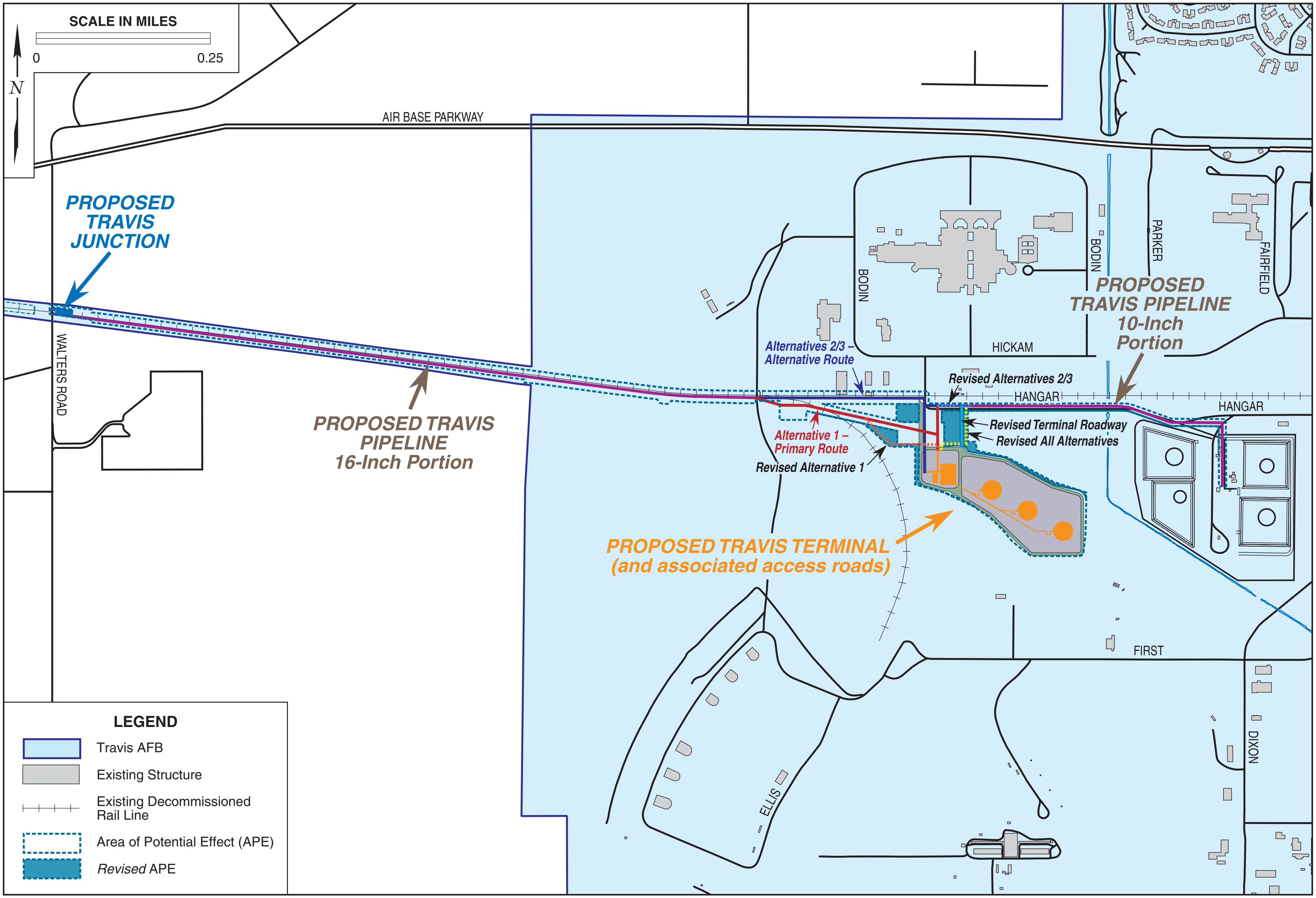
Determination: Based on this analysis, I determined that this project has no potential to have an effect on historic property. If you have any questions regarding this project, please contact me at (707) 424-7515 or dave.musselwhite@travis.af.mil.

Sincerely

DAVID H. MUSSELWHITE, YC-02, DAF
Chief, Asset Management Flight
Acting Cultural Resources Manager

Attachment:
Revised APE Map

No warranty is made by the State/Territory as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.
This map is a "living document," in that it is intended to change as new data become available and are incorporated into the GIS database.



SHPO

Revised Proposed Project Area of Potential Effect (APE)

FIGURE 1

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
SACRAMENTO, CA 94296-0001
(916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov
www.ohp.parks.ca.gov

Rec'd 11/6/09 RMP

October 29, 2009 Reply In Reference To: USAF090810B

Rudy M. Pontemayor, P.E.
Environmental Planner
Department of the Air Force
60 CES/CEA/CEAO
411 Airman Drive
Travis AFB, CA 94535

RE: Construction of Jet Fuel Pipeline and Receiving Facility, Travis Air Force Base

Dear Mr. Pontemayor:

Thank you for your letter dated 10 August 2009, which submitted a draft report, *Environmental Assessment for the Outgrant of Real Estate and Construction of a JP-8 Pipeline and Receiving Facility at Travis Air Force Base* (August 2009) for my review. I have also received your 28 August 2009 letter informing me that you have determined that this project has no potential to effect historic properties. Although your letter doesn't mention it specifically, I believe you are requesting my review and comment with regard to this undertaking at Travis AFB and consulting with me in order to comply with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f), as amended, and its implementing regulation at 36 CFR Part 800.

The project, as I understand it, is to outgrant Travis AFB real estate to SFPP, L.P., for the purpose of installing, owning, operating, and maintaining a jet fuel (JP-8) pipeline, receiving facility, and associated ancillary equipment. This will enhance the existing JP-8 distribution and dispensation infrastructure for USAF Air Mobility Command missions by increasing the base's access to SFPP's modernized fuel distribution network.

Your letter also includes a map identifying the Area of Potential Effect (APE) for this project. Your review of previous cultural resource studies within the area revealed no properties eligible for listing in the National Register of Historic Places (NRHP). Therefore, the U.S. Air Force has applied the Criteria of Adverse Effect (36 CFR § 800.5(a)(1)) and concluded that the undertaking will not affect historic resources. Based upon a review of the materials you submitted with your letter, I concur that pursuant to 36 CFR § 800.4(d) a finding of No Historic Properties Affected is appropriate for the undertaking as described. Be advised that under certain circumstances, such as unanticipated discovery or a change in project description, the Air Force may have additional future responsibilities for this undertaking under 36 CFR Part 800.

Thank you for considering historic properties as part of your project planning. If you have any questions or concerns, please contact Mark Beason, at (916) 653-8902 or mbeason@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

APPENDIX F

HAZARDOUS AND PETROLEUM WASTE STREAMS AT TRAVIS AIR FORCE BASE (2005)

Appendix F
Hazardous and Petroleum Waste Streams at Travis Air Force Base (2005)

Bldg. No.	Facility	Distance from Outgrant Area	Number of Streams	Annual Amount	
				Liquid Waste (gal)	Solid Waste (lbs)
755	Battery Shop	<0.25 Mile	7	10	72,507
771	Aero Club	<0.25 Mile	1	400	N/A
775	DGMC Dental Lab	<0.25 Mile	2	None	600
777	DGMC Main Hospital Building	<0.25 Mile	6	None	2,225
779	DGMC Power Plant	<0.25 Mile	2	1,000	1,000
793	DGMC Hazardous Waste Point	<0.25 Mile	14	100	750
803	Metals Technology	<0.25 Mile	7	None	1,724
803	Paint Shop	<0.25 Mile	4	None	10,600
803	Non-Destructive Impact	<0.25 Mile	8	110	21,002
804	Precision Measurement Equipment Laboratory	<0.25 Mile	2	75	15
525	Survival Equipment	0.25 to 0.50 Mile	2	None	400
549	60th Aerial Port Squadron	0.25 to 0.50 Mile	1	None	5
549	Material Handling	0.25 to 0.50 Mile	4	10	30
551	Fuel Systems	0.25 to 0.50 Mile	4	None	2,700
809	Inspection	0.25 to 0.50 Mile	5	None	13,420
811	Hillstrom Industries Washrack	0.25 to 0.50 Mile	2	None	1,250
819	Hydraulics	0.25 to 0.50 Mile	3	1,470	None
819	Electro-Environmental	0.25 to 0.50 Mile	2	165	500
819	Aero Repair Shop	0.25 to 0.50 Mile	4	220	1,170
828	Security Police	0.25 to 0.50 Mile	1	None	100
833	Readiness Flight	0.25 to 0.50 Mile	5	None	220
863	Outdoor Recreation	0.25 to 0.50 Mile	2	10	50
16	TF-39 Jet Ship	0.50 to 1.0 Mile	8	None	6,885
21	Avionics	0.50 to 1.0 Mile	2	None	1,005
31	60th Military Occupational Specialty	0.50 to 1.0 Mile	1	None	200
139	Fire Truck Maintenance	0.50 to 1.0 Mile	4	550	500
139	Heavy Vehicle Maintenance	0.50 to 1.0 Mile	5	550	500
143	Allied Trades Paint Booth	0.50 to 1.0 Mile	2	60	250
144	Allied Trades	0.50 to 1.0 Mile	4	None	460
148	Detachment 14	0.50 to 1.0 Mile	1	None	50
155	C5 Aircraft Carrier	0.50 to 1.0 Mile	3	None	450
170	Car Care Center	0.50 to 1.0 Mile	6	None	17,820

Bldg. No.	Facility	Distance from Outgrant Area	Number of Streams	Annual Amount	
				Liquid Waste (gal)	Solid Waste (lbs)
170	Shoppette/Gasoline	0.50 to 1.0 Mile	2	None	432
179	KC-10 Aircrew Maintenance Training	0.50 to 1.0 Mile	1	260	None
841	Flightline Support	0.50 to 1.0 Mile	9	None	28,860
843	Stand Maintenance/Auxiliary Power Unit	0.50 to 1.0 Mile	2	None	395
845	Structural Fiberglass	0.50 to 1.0 Mile	5	None	25,850
872	Horizontal Repair	0.50 to 1.0 Mile	2	None	6,600
874	Structures	0.50 to 1.0 Mile	3	2	1,230
879	Vertical Repair	0.50 to 1.0 Mile	2	5	20
904	Power Pro/Heating, Ventilating, and Air Conditioning	0.50 to 1.0 Mile	5	60	780
908	Liquid Fuels System	0.50 to 1.0 Mile	5	30	2,600
919	L/MHE Repair	0.50 to 1.0 Mile	10	900	980
931	Power Production	0.50 to 1.0 Mile	5	1,000	3,000
942	Electric Shop	0.50 to 1.0 Mile	1	None	5
977	Material Handling	0.50 to 1.0 Mile	1	None	50
981	Vehicle Operations	0.50 to 1.0 Mile	1	None	1,200
1001	Jet Engine Test Cell	0.50 to 1.0 Mile	1	None	250
1	Aerospace Ground Equipment	>1.0 Mile	6	130	90
1	Ground Support Equipment	>1.0 Mile	4	None	2,660
14	Fuel Cell	>1.0 Mile	4	None	1,500
41	C5 Aircraft Aerospace Ground Equipment	>1.0 Mile	6	2,860	24,600
80	Historical Society Museum	>1.0 Mile	2	None	70
83	Life Support	>1.0 Mile	2	None	110
181	Life Support	>1.0 Mile	2	None	125
187	Flightline Support	>1.0 Mile	8	12,640	30,500
187	Life Support	>1.0 Mile	1	None	15
226	Auto Hobby Shop	>1.0 Mile	6	5,280	6,745
377	Aircraft Maintenance and Engineering Operations	>1.0 Mile	1	None	250
380a	Combat Arms Training and Maintenance	>1.0 Mile	1	None	1,200
381	Heating, Ventilating, and Air Conditioning	>1.0 Mile	3	400	200
1171	Fleet Air Reconnaissance	>1.0 Mile	9	None	8,100
1177	Fleet Air Reconnaissance	>1.0 Mile	8	None	14,810
1185	Radar/Meteorological Navigation	>1.0 Mile	3	None	511
1202	Fuels Management	>1.0 Mile	1	None	1,500
1202	Refuel Maintenance	>1.0 Mile	5	150	450
1205	Civil Engineering Maintenance, Inspection, and Repair Team	>1.0 Mile	8	200	1,105

Bldg. No.	Facility	Distance from Outgrant Area	Number of Streams	Annual Amount	
				Liquid Waste (gal)	Solid Waste (lbs)
1212	Life Support	>1.0 Mile	1	None	150
1365	Treatment, Storage, and Disposal Facility	>1.0 Mile	11	None	31,475
1370	Combat Arms Training and Maintenance	>1.0 Mile	1	None	2,500
5601	Golf Course	>1.0 Mile	2	None	1,300
ANNUAL TOTAL (2005)			**274 Streams**	**28,647 Gallons**	**180.3 Tons**

Source: USAF 2005.

APPENDIX G

UNDERGROUND STORAGE TANKS (USTs) AT TRAVIS AIR FORCE BASE

Appendix G
Underground Storage Tanks (USTs) at Travis Air Force Base

Function	ID No.	Distance from Outgrant Area	Product	Capacity	Status
Normal Operation	UT1001-4	0.50 to 1.0 Mile	JP-8	10,000	active
Normal Operation	UT1001-5	0.50 to 1.0 Mile	JP-8	10,000	active
Normal Operation	UT1041-1	0.50 to 1.0 Mile	JP-8	4,000	active
Normal Operation	UT133-4	0.50 to 1.0 Mile	Gasoline	20,000	active
Normal Operation	UT133-5	0.50 to 1.0 Mile	Diesel	20,000	active
Normal Operation	UT133-6	0.50 to 1.0 Mile	Biodiesel	20,000	active
Normal Operation	UT170-10	0.50 to 1.0 Mile	Gasoline	20,000	active
Normal Operation	UT170-8	0.50 to 1.0 Mile	Diesel	20,000	active
Normal Operation	UT170-9	0.50 to 1.0 Mile	Gasoline	20,000	active
Normal Operation	UT171-5	0.50 to 1.0 Mile	Gasoline	20,000	active
Normal Operation	UT171-6	0.50 to 1.0 Mile	Gasoline	20,000	active
Normal Operation	UT171-7	0.50 to 1.0 Mile	Gasoline	20,000	active
Normal Operation	UT1779-5	0.50 to 1.0 Mile	JP-8	4,000	active
Normal Operation	UT1797-2	0.50 to 1.0 Mile	JP-8	2,000	active
Normal Operation	UT1733-2	>1.0 Mile	JP-8	4,000	active
Normal Operation	UT221-2	>1.0 Mile	Diesel	5,000	active
Emergency Spill	UT801-2	<0.25 Mile	Waste Oil	1,000	active
Emergency Spill	UT886A	0.25 to 0.50 Mile	JP-8	6,000	active
Emergency Spill	UT154-1	0.50 to 1.0 Mile	Hydraulic Fluid	500	active
Emergency Spill	UT155-1	0.50 to 1.0 Mile	Hydraulic Fluid	500	active
Emergency Spill	UT179-1	0.50 to 1.0 Mile	Hydraulic Fluid	550	active
Emergency Spill	UT14-1	>1.0 Mile	Waste Oil	600	active
Emergency Spill	UT14B	>1.0 Mile	N/A	120,000	active
Emergency Spill	UT1733-9	>1.0 Mile	Waste Oil	500	active
Emergency Spill	UT1202C	>1.0 Mile	Waste Oil	6,000	inactive

Sources: USAF 2008a, 2008c, 2008d.

APPENDIX H

ABOVEGROUND STORAGE TANKS (ASTs) AT TRAVIS AIR FORCE BASE

Appendix H
Aboveground Storage Tanks (USTs) at Travis Air Force Base

ID No.	Distance from Outgrant Area	Product	Capacity	Configuration	Status
1755[1]	<0.25 Mile	Diesel	20,000	Double-Wall	active
1757[1]	<0.25 Mile	JP-8	4,200,000	Single-Wall	active
1758[1]	<0.25 Mile	JP-8	4,200,000	Single-Wall	active
1773[1]	<0.25 Mile	JP-8	2,310,000	Single-Wall	active
1778[1]	<0.25 Mile	JP-8	2,310,000	Single-Wall	active
T779A	<0.25 Mile	Fuel Oil	25,000	Double-Wall	active
T779B	<0.25 Mile	Fuel Oil	25,000	Double-Wall	active
T779C	<0.25 Mile	Fuel Oil	25,000	Double-Wall	active
T801A	<0.25 Mile	Diesel	700	Single-Wall	active
T801B	<0.25 Mile	Diesel	700	Single-Wall	active
T801C	<0.25 Mile	Diesel	700	Single-Wall	active
T801D	<0.25 Mile	Diesel	700	Single-Wall	active
No ID[2]	<0.25 Mile	Gasoline	175	N/A	active
T755A	<0.25 Mile	Heating Oil	300	Single-Wall	inactive
T771A	<0.25 Mile	Avgas	6,000	Double-Wall	inactive
T771B	<0.25 Mile	Avgas	6,000	Double-Wall	inactive
T551A	0.25 to 0.50 Mile	Calibrating Fluid	250	N/A	active
T551B	0.25 to 0.50 Mile	Lube Oil	250	N/A	active
T648A	0.25 to 0.50 Mile	Diesel	300	Double-Wall	active
T650A	0.25 to 0.50 Mile	Diesel	300	Double-Wall	active
T811A	0.25 to 0.50 Mile	Diesel	100	Double-Wall	active
T811B	0.25 to 0.50 Mile	Diesel	5,000	Double-Wall	active
T811F	0.25 to 0.50 Mile	Detergent	2,000	N/A	active
T811G	0.25 to 0.50 Mile	PD680 Solvent	6,000	Double-Wall	active
T828A	0.25 to 0.50 Mile	Diesel	25	N/A	active
T3701A	0.25 to 0.50 Mile	Diesel	50	N/A	active
1001	0.50 to 1.0 Mile	Wastewater	2,000	N/A	active
1186	0.50 to 1.0 Mile	Diesel	300	Double-Wall	active
1768	0.50 to 1.0 Mile	JP-8	420,000	Single-Wall	active
1769	0.50 to 1.0 Mile	JP-8	420,000	Single-Wall	active
1770	0.50 to 1.0 Mile	JP-8	420,000	Single-Wall	active
1777	0.50 to 1.0 Mile	JP-8	420,000	Single-Wall	active
1795	0.50 to 1.0 Mile	JP-8	210,000	Single-Wall	active
1796	0.50 to 1.0 Mile	JP-8	210,000	Single-Wall	active

ID No.	Distance from Outgrant Area	Product	Capacity	Configuration	Status
T24A	0.50 to 1.0 Mile	Diesel	186	Double-Wall	active
T31A	0.50 to 1.0 Mile	Diesel	2,000	Double-Wall	active
T141A	0.50 to 1.0 Mile	Diesel	50	N/A	active
T170[3]	0.50 to 1.0 Mile	Antifreeze	150	N/A	active
T170[4]	0.50 to 1.0 Mile	Engine Oil	150	N/A	active
T170D	0.50 to 1.0 Mile	Used Antifreeze	415	Double-Wall	active
T170E	0.50 to 1.0 Mile	Transmission Fluid	240	Double-Wall	active
T170G	0.50 to 1.0 Mile	Waste Oil	500	Double-Wall	active
T175A	0.50 to 1.0 Mile	Diesel	145	Double-Wall	active
T561A	0.50 to 1.0 Mile	Diesel	300	Double-Wall	active
T680A	0.50 to 1.0 Mile	Diesel	100	Double-Wall	active
T680B	0.50 to 1.0 Mile	Diesel	300	Single-Wall	active
T827A	0.50 to 1.0 Mile	Diesel	300	Double-Wall	active
T834A	0.50 to 1.0 Mile	Diesel	150	Double-Wall	active
T834B	0.50 to 1.0 Mile	Diesel	150	Double-Wall	active
T834C	0.50 to 1.0 Mile	Diesel	150	Double-Wall	active
T872A	0.50 to 1.0 Mile	Gasoline	2,000	N/A	active
T872B	0.50 to 1.0 Mile	Diesel	2,000	N/A	active
T916B	0.50 to 1.0 Mile	Diesel	600	Double-Wall	active
T918A	0.50 to 1.0 Mile	Diesel	100	Double-Wall	active
T934A	0.50 to 1.0 Mile	Diesel	100	Double-Wall	active
T1041C	0.50 to 1.0 Mile	Diesel	300	Double-Wall	active
T1747	0.50 to 1.0 Mile	Diesel	5,000	Double-Wall	active
T1750	0.50 to 1.0 Mile	Gasoline	5,000	Double-Wall	active
T1797A	0.50 to 1.0 Mile	Diesel	230	Double-Wall	active
Outfall II	0.50 to 1.0 Mile	Wastewater	2,000	N/A	inactive
Outfall IV	0.50 to 1.0 Mile	Wastewater	2,000	N/A	inactive
P-18	0.50 to 1.0 Mile	Wastewater	3,000	N/A	inactive
T892A	0.50 to 1.0 Mile	Propane	30,000	N/A	inactive
T892B	0.50 to 1.0 Mile	Propane	30,000	N/A	inactive
T916A	0.50 to 1.0 Mile	Diesel	10,000	Double-Wall	inactive
1732	>1.0 Mile	JP-8	420,000	Single-Wall	active
1772	>1.0 Mile	JP-8	420,000	Single-Wall	active
T1A	>1.0 Mile	Diesel	79	Double-Wall	active
T6A	>1.0 Mile	Diesel	5,000	Double-Wall	active
T6B	>1.0 Mile	Diesel	200	Double-Wall	active
T8A	>1.0 Mile	Diesel	300	Double-Wall	active
T8B	>1.0 Mile	Diesel	500	Double-Wall	active

ID No.	Distance from Outgrant Area	Product	Capacity	Configuration	Status
T10A	>1.0 Mile	Diesel	600	Double-Wall	active
T11A	>1.0 Mile	Diesel	5,000	N/A	active
T14A	>1.0 Mile	Diesel	640	Double-Wall	active
T39A	>1.0 Mile	Diesel	366	Double-Wall	active
T41A	>1.0 Mile	Diesel	10,000	Double-Wall	active
T41B	>1.0 Mile	Diesel	10,000	Double-Wall	active
T41C	>1.0 Mile	JP-8	6,000	Double-Wall	active
T41D	>1.0 Mile	Engine Oil	1,000	Double-Wall	active
T41E	>1.0 Mile	Engine Oil	1,000	Double-Wall	active
T54A	>1.0 Mile	Diesel	250	Double-Wall	active
T221A	>1.0 Mile	Diesel	235	Single-Wall	active
T221B	>1.0 Mile	Diesel	235	Single-Wall	active
T237A	>1.0 Mile	Diesel	79	Double-Wall	active
T241A	>1.0 Mile	Diesel	500	Double-Wall	active
T243A	>1.0 Mile	Diesel	560	Double-Wall	active
T253A	>1.0 Mile	Diesel	300	Single-Wall	active
T380A	>1.0 Mile	Diesel	500	Double-Wall	active
T993A	>1.0 Mile	Diesel	300	Double-Wall	active
T1115A	>1.0 Mile	Diesel	186	Double-Wall	active
T1125A	>1.0 Mile	Diesel	186	Double-Wall	active
T1130A	>1.0 Mile	Diesel	186	Double-Wall	active
T1135A	>1.0 Mile	Diesel	186	Double-Wall	active
T1150A	>1.0 Mile	Diesel	194	Double-Wall	active
T1171A	>1.0 Mile	Diesel	366	Double-Wall	active
T1175A	>1.0 Mile	Diesel	125	Double-Wall	active
T1177A	>1.0 Mile	Diesel	350	Double-Wall	active
T1185A	>1.0 Mile	Diesel	750	Double-Wall	active
T1201A	>1.0 Mile	Deicing Fluid	5,000	N/A	active
T1207A	>1.0 Mile	Diesel	186	Double-Wall	active
T1290A	>1.0 Mile	Diesel	186	Double-Wall	active
T1365A	>1.0 Mile	Waste Oil	2,500	Double-Wall	active
T1365B	>1.0 Mile	Waste Oil	2,500	Double-Wall	active
T1365C	>1.0 Mile	Waste Oil	2,500	Double-Wall	active
T1365D	>1.0 Mile	Waste Oil	2,500	Double-Wall	active
T1365E	>1.0 Mile	Waste Oil	2,500	Double-Wall	active
T1365F	>1.0 Mile	Waste JP-8	2,500	Double-Wall	active
T1514A	>1.0 Mile	Diesel	500	Double-Wall	active
T1733A	>1.0 Mile	Diesel	325	Double-Wall	active

ID No.	Distance from Outgrant Area	Product	Capacity	Configuration	Status
T2010A	>1.0 Mile	Gasoline	1,000	Double-Wall	active
T2010B	>1.0 Mile	Diesel	550	Double-Wall	active
T2010C	>1.0 Mile	Hydraulic Fluid	275	N/A	active
T2029A	>1.0 Mile	Diesel	250	Double-Wall	active
T2037A	>1.0 Mile	Diesel	500	Double-Wall	active
T2038A	>1.0 Mile	Diesel	500	Double-Wall	active
T2040A	>1.0 Mile	Diesel	450	Double-Wall	active
T2041A	>1.0 Mile	Diesel	450	Double-Wall	active
T8499A	>1.0 Mile	Diesel	230	Double-Wall	active
T94946A	>1.0 Mile	Diesel	250	Double-Wall	active
T1295A	>1.0 Mile	Diesel	186	N/A	inactive

[1] – tank is located at the Bulk Fuels Storage Area.
[2] – tank does not have an assigned ID; it is located at the Aero Club near Tanks T771A and T771B.
[3] – T170 antifreeze tank.
[4] – T170 engine oil tank.
N/A – not available
Sources: USAF 2008a, 2008c, 2008e.

APPENDIX I

REMOVED UNDERGROUND STORAGE TANKS (USTs) AT TRAVIS AIR FORCE BASE

Appendix I

Removed Underground Storage Tanks (USTs) at Travis Air Force Base

ID No.	Distance from Outgrant Area	Product	Removal Date	Closure Status/Date	RWQCB Case No.
771A	<0.25 Mile	Gasoline	1993	Site Closed, 30 Oct 2002	48D9063
771B	<0.25 Mile	Gasoline	1993	Site Closed, 30 Oct 2002	48D9063
771C	<0.25 Mile	Avgas	1993	Site Closed, 30 Oct 2002	48D9063
1768[1]	<0.25 Mile	JP-4	1997	Open/Under Investigation	48D9037
1768[2]	<0.25 Mile	JP-8	2002	Open/Under Investigation	48D9037
502	0.25 to 0.50 Mile	Diesel	1992	Site Closed, 30 Oct 2002	48D9060
550	0.25 to 0.50 Mile	Diesel	1994	Site Closed, 30 Oct 2002	48D9061
551A	0.25 to 0.50 Mile	Waste Oil	1992	Site Closed, 30 Oct 2002	48D9025
551B	0.25 to 0.50 Mile	Propane	1992	Site Closed, 30 Oct 2002	48D9026
551C	0.25 to 0.50 Mile	PD 680	1992	Site Closed, 30 Oct 2002	48D9026
551D	0.25 to 0.50 Mile	Waste Oil	1992	Site Closed, 30 Oct 2002	48D9026
619	0.25 to 0.50 Mile	Hydraulic Fluid	1993	Site Closed, 30 Oct 2002	48D9062
810A	0.25 to 0.50 Mile	No. 2 Fuel	1992	Site Closed, 8 Apr 2003	48D9027
18	0.50 to 1.0 Mile	Propane	1998	Site Closed, 8 Apr 2003	48D9064
170A	0.50 to 1.0 Mile	Gasoline	1994	Open/Under Investigation	48D9022
170B	0.50 to 1.0 Mile	Gasoline	1994	Open/Under Investigation	48D9022
170C	0.50 to 1.0 Mile	Gasoline	1994	Open/Under Investigation	48D9022
170D	0.50 to 1.0 Mile	Gasoline	1994	Open/Under Investigation	48D9022
170E	0.50 to 1.0 Mile	Gasoline	1994	Open/Under Investigation	48D9022
170F	0.50 to 1.0 Mile	Gasoline	1994	Open/Under Investigation	48D9022
170G	0.50 to 1.0 Mile	Waste Oil	1993	Open/Under Investigation	48D9023
171A[3]	0.50 to 1.0 Mile	Diesel	2003	Site Closed, 4 May 2007	48D9067
171A[4]	0.50 to 1.0 Mile	Gasoline	2003	Site Closed, 4 May 2007	48D9067
171B[3]	0.50 to 1.0 Mile	Diesel	2003	Site Closed, 4 May 2007	48D9067
171B[4]	0.50 to 1.0 Mile	Gasoline	2003	Site Closed, 4 May 2007	48D9067
171C[3]	0.50 to 1.0 Mile	Diesel	2003	Site Closed, 4 May 2007	48D9067
171C[4]	0.50 to 1.0 Mile	Gasoline	2003	Site Closed, 4 May 2007	48D9067
171D[3]	0.50 to 1.0 Mile	Diesel	2003	Site Closed, 4 May 2007	48D9067
171D[4]	0.50 to 1.0 Mile	Gasoline	2003	Site Closed, 4 May 2007	48D9067
835	0.50 to 1.0 Mile	Fuel Oil	1992	Site Closed, 6 Mar 2003	48D9028
837	0.50 to 1.0 Mile	Fuel Oil	1992	Site Closed, 6 Mar 2003	48D9009
838	0.50 to 1.0 Mile	N/A	N/A	Open/Under Investigation	N/A
872A	0.50 to 1.0 Mile	Gasoline	1993	Site Closed, 6 Mar 2003	48D9010
872B	0.50 to 1.0 Mile	Diesel	1993	Site Closed, 6 Mar 2003	48D9010

ID No.	Distance from Outgrant Area	Product	Removal Date	Closure Status/Date	RWQCB Case No.
905	0.50 to 1.0 Mile	Pesticide Waste	1996	Open/Under Investigation	N/A
916C	0.50 to 1.0 Mile	Diesel	1994	Site Closed, 6 Mar 2003	48D9011
1779C	0.50 to 1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9043
1779D	0.50 to 1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9044
1791A	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1791B	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1791C	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1791D	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1791E	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1791F	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1791G	0.50 to 1.0 Mile	JP-4/JP-8	1998	Open/Under Investigation	48D9045
1793A	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793B	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793C	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793D	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793E	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793F	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793G	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1793H	0.50 to 1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1797	0.50 to 1.0 Mile	JP-4/Water	1995	Open/Under Investigation	48D9048
1798A	0.50 to 1.0 Mile	Diesel	1993	Site Closed, 6 Mar 2003	48D9049
1798B	0.50 to 1.0 Mile	Gasoline	1993	Site Closed, 6 Mar 2003	48D9049
1947	0.50 to 1.0 Mile	Diesel	2002	Open/Under Investigation	N/A
6000A	0.50 to 1.0 Mile	N/A	1995	Site Closed, 16 Dec 2003	48D9050
6000B	0.50 to 1.0 Mile	N/A	1995	Site Closed, 16 Dec 2003	48D9050
6000C	0.50 to 1.0 Mile	N/A	1995	Site Closed, 16 Dec 2003	48D9050
6000D	0.50 to 1.0 Mile	N/A	1995	Site Closed, 16 Dec 2003	48D9050
6010A	0.50 to 1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9051
6010B	0.50 to 1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9051
6010C	0.50 to 1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9051
6010D	0.50 to 1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9051
9398	0.50 to 1.0 Mile	Gasoline	<1986	Site Closed, 1 Mar 2000	48D9001
UT834-1	0.50 to 1.0 Mile	Waste Oil	1998	Open/Under Investigation	N/A
8	>1.0 Mile	Diesel	1992	Site Closed, 8 Apr 2003	48D9015
16[5]	>1.0 Mile	Avgas	1996	Site Closed, 8 Apr 2003	48D9016
16[6]	>1.0 Mile	Collection Tank	1996	Site Closed, 8 Apr 2003	48D9016
16[7]	>1.0 Mile	Propane	1996	Site Closed, 8 Apr 2003	48D9016
16[8]	>1.0 Mile	Propane	1996	Site Closed, 8 Apr 2003	48D9016

ID No.	Distance from Outgrant Area	Product	Removal Date	Closure Status/Date	RWQCB Case No.
16[9]	>1.0 Mile	Pickling Oil	1996	Site Closed, 8 Apr 2003	48D9016
20	>1.0 Mile	Diesel	1992	Site Closed, 8 Apr 2003	48D9017
32C	>1.0 Mile	Fuel Oil	1992	Site Closed, 8 Apr 2003	48D9056
41A	>1.0 Mile	Gasoline	1995	Site Closed, 8 Apr 2003	48D9018
41B	>1.0 Mile	Diesel	1995	Site Closed, 8 Apr 2003	48D9018
41C	>1.0 Mile	JP-4	1995	Site Closed, 8 Apr 2003	48D9018
106	>1.0 Mile	Heating Oil	1992	Site Closed, 16 Dec 2003	48D9057
112	>1.0 Mile	Heating Oil	1992	Site Closed, 16 Dec 2003	48D9058
133A	>1.0 Mile	Gasoline	1993	Site Closed, 16 Dec 2003	48D9019
133B	>1.0 Mile	Gasoline	1994	Site Closed, 16 Dec 2003	48D9020
133C	>1.0 Mile	Diesel	1994	Site Closed, 16 Dec 2003	48D9020
139A	>1.0 Mile	Gasoline	<1986	Site Closed, 8 Apr 2003	48D9021
221	>1.0 Mile	N/A	1995	Open/Under Investigation	48D9002
226	>1.0 Mile	N/A	1992	Site Closed, 30 Oct 2002	48D9059
365	>1.0 Mile	JP-4/Water	1995	Open/Under Investigation	48D9024
382A	>1.0 Mile	N/A	1995	Open/Under Investigation	48D9003
382B	>1.0 Mile	N/A	1993	Open/Under Investigation	48D9003
818A	>1.0 Mile	N/A	1995	Open/Under Investigation	48D9004
1060	>1.0 Mile	N/A	2003	Open/Under Investigation	N/A
1312	>1.0 Mile	N/A	1992	Open/Under Investigation	48D9005
1325	>1.0 Mile	N/A	1994	Site Closed, 30 Oct 2002	48D9012
1348	>1.0 Mile	N/A	1993	Open/Under Investigation	48D9006
1783	>1.0 Mile	N/A	1995	Site Closed, 6 Mar 2003	48D9014
1001A	>1.0 Mile	JP-4	1993	Site Closed, 8 Apr 2003	48D9030
1001B	>1.0 Mile	JP-4	1995	Site Closed, 8 Apr 2003	48D9029
1001C	>1.0 Mile	Waste Oil	1995	Site Closed, 8 Apr 2003	48D9029
1743A	>1.0 Mile	JP-4	<1986	Open/Under Investigation	48D9031
1743B	>1.0 Mile	JP-4	<1986	Open/Under Investigation	48D9032
1746A	>1.0 Mile	Unclassified	1995	Site Closed, 6 Mar 2003	48D9013
1746B	>1.0 Mile	Unclassified Jet Fuel	1995	Site Closed, 6 Mar 2003	48D9013
1750B	>1.0 Mile	N/A	1992	Open/Under Investigation	48D9007
1766A	>1.0 Mile	Diesel	<1986	Open/Under Investigation	48D9033
1766B	>1.0 Mile	Diesel	<1986	Open/Under Investigation	48D9034
1766C	>1.0 Mile	Diesel	<1986	Open/Under Investigation	48D9035
1767C	>1.0 Mile	Waste Oil	<1986	Open/Under Investigation	48D9036
1771A	>1.0 Mile	Gasoline	<1986	Open/Under Investigation	48D9038
1771B	>1.0 Mile	Gasoline	<1986	Open/Under Investigation	48D9039

ID No.	Distance from Outgrant Area	Product	Removal Date	Closure Status/Date	RWQCB Case No.
1771C	>1.0 Mile	Gasoline	<1986	Open/Under Investigation	48D9040
1771D	>1.0 Mile	Gasoline	<1986	Open/Under Investigation	48D9041
1771E	>1.0 Mile	Gasoline	<1986	Open/Under Investigation	48D9042
1771F	>1.0 Mile	N/A	N/A	Open/Under Investigation	N/A
1792A	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1792B	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1792C	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1792D	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1792E	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1792F	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1792G	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9046
1794A	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9047
1794B	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9047
1794C	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9047
1794D	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9047
1794E	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9047
1794F	>1.0 Mile	JP-4/JP-8	1997	Open/Under Investigation	48D9047
6020A	>1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9052
6020B	>1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9052
6020C	>1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9052
6020D	>1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9052
6030	>1.0 Mile	N/A	1994	Site Closed, 16 Dec 2003	48D9053
6040A	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9054
6040B	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9054
6040C	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9054
6040D	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9054
6050A	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9055
6050B	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9055
6050C	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9055
6050D	>1.0 Mile	N/A	N/A	Site Closed, 16 Dec 2003	48D9055

[1] – original UST 1768: install date unknown; removed in 1997.
[2] – replacement UST 1768: installed in 1998; removed in 2002.
[3] – diesel component of dual storage tank (USTs 171A, 171B, 171C, and 171D)
[4] – avgas storage tank (UST 16)
[5] – avgas storage tank (UST 16)
[6] – collection storage tank (UST 16)
[7] – primary propane storage tank (UST 16)
[8] – secondary propane storage tank (UST 16)
[9] – pickling oil storage tank (UST 16)
N/A – not available
Sources: U.S. Army Corps of Engineers 2009a; USAF 2003d, 2003e, 2006a, 2008c, 2009c.

APPENDIX J

OIL/WATER SEPARATORS (OWSs) AT TRAVIS AIR FORCE BASE

Appendix J
Oil/Water Separators (OWSs) at Travis Air Force Base

OWS No.	Function	Location (Bldg. No.)	Distance from Outgrant Area	Type	Status
36	Fuel Tank Area F Containment	1775	<0.25 Mile	belowground	not used
37	Fuel Tank Area F Containment	1778	<0.25 Mile	belowground	not used
1	Jet Engine Washrack	P18	>0.25 Mile	belowground	not used
2	Vehicle Maintenance Floor Drains	139W	>0.25 Mile	belowground	active
3	Motorpool Vehicle Washrack	140	>0.25 Mile	belowground	active
4	Auto Hobby Shop Washrack & Floor Drains	226	>0.25 Mile	belowground	active
5	Fuel Cell Repair Shop	551	>0.25 Mile	unknown	removed
6	Flightline Fire Station Washrack	560	>0.25 Mile	belowground	active
7	Base Car Wash	619	>0.25 Mile	unknown	removed
8	Fuel Cell Maintenance Floor Drains	808E	>0.25 Mile	belowground	active
9	Fuel Cell Maintenance Floor Drains	808W	>0.25 Mile	belowground	active
10	Aircraft Hangar Floor Drains	809N	>0.25 Mile	belowground	active
11	Aircraft Hangar Dock Floor Drains	809S	>0.25 Mile	belowground	active
12	Aircraft Washrack	811	>0.25 Mile	belowground	active
13	Aircraft Maintenance	818 N	>0.25 Mile	unknown	removed
14	Aircraft Maintenance	818 S	>0.25 Mile	unknown	removed
15	Vehicle/Equipment Washrack	872	>0.25 Mile	belowground	active
16	Aerial Port Vehicle Maintenance Floor Drains	919	>0.25 Mile	aboveground	active
17	Jet Engine Test Cell Floor Drains	1001	>0.25 Mile	aboveground	not used
18	Fuel Truck Maintenance Floor Drains	1202	>0.25 Mile	belowground	not used
19	Generator Maintenance Washrack	1205	>0.25 Mile	belowground	active
20	Vehicle Washrack	1388	>0.25 Mile	unknown	removed
21	Hydrant Fuels Storm Water (Area H)	1779	>0.25 Mile	unknown	not used
22	Hydrant Fuels Storm Water (Area G)	1797	>0.25 Mile	belowground	not used
23	Fuel Truck Washrack	1833	>0.25 Mile	belowground	not used
24	Motorpool Equipment Washrack	1904	>0.25 Mile	belowground	active
25	AGE Equipment Washrack	42	>0.25 Mile	belowground	active
26	Generator Maintenance Washrack	P1	>0.25 Mile	aboveground	not used

OWS No.	Function	Location (Bldg. No.)	Distance from Outgrant Area	Type	Status
27	Maintenance Hanger Floor Drains	14	>0.25 Mile	belowground	not used
28	AGE Refueling Pad Storm Water	42-A	>0.25 Mile	belowground	active
29	Motorpool Vehicle Maintenance Floor Drains	139E	>0.25 Mile	belowground	active
30	Services Car Wash	603	>0.25 Mile	belowground	active
31	Hydraulic Multipallet Lift Sump Drain	960	>0.25 Mile	aboveground	active
32	Aerial Port Vehicle Washrack	981	>0.25 Mile	belowground	active
33	Hydrant Fuels Storm Water (Area C)	1041	>0.25 Mile	belowground	not used
34	Vehicle/Equipment Washrack	1177	>0.25 Mile	aboveground	active
35	Hydrant Fuels Storm Water (Area B)	1732/1733	>0.25 Mile	belowground	not used
38	Dormitory Area Car Wash	1359	>0.25 Mile	belowground	inactive
39	Dormitory Area Car Wash	1361	>0.25 Mile	belowground	inactive
40	Fuel Truck Maintenance Floor Drains	554	>0.25 Mile	belowground	active
41	Fuel Lab Sink	552	>0.25 Mile	unknown	active

Sources: USAF 2007b, 2008a.

APPENDIX K

SPECIAL-STATUS SPECIES KNOWN TO OCCUR IN SOLANO COUNTY, CALIFORNIA

Appendix K

Special-Status Species Known to Occur in Solano County, California

(Species listed in bold may potentially occur at Travis Air Force Base)

Common Name	Scientific Name	Listing		
		ESA	*CESA*	*IREP*
Plants				
Suisun marsh aster	*Aster lentus*	NL	NL	1B
Ferris's milk-vetch	*Astragalus tener* var. *ferrisiae*	NL	NL	1B
Alkali milk-vetch	***Astragalus tener.* var. *tener***	**NL**	**NL**	**1B**
Heartscale	***Atriplex cordulata***	**NL**	**NL**	**1B**
Brittlescale	***Atriplex depressa***	**NL**	**NL**	**1B**
San Joaquin spearscale	***Atriplex joaquiniana***	**NL**	**NL**	**1B**
Vernal pool smallscale	*Atriplex persistens*	NL	NL	1B
Big-scale balsamroot	*Balsamorhiza macrolepis* var. *macrolepis*	NL	NL	1B
Big tarplant	*Blepharizonia plumose*	NL	NL	1B
Mt. Diablo fairy-lantern	*Calochortus pulchellus*	NL	NL	1B
Holly-leaved ceanothus	*Ceanothus purpureus*	NL	NL	1B
Congdon's tarplant	*Centromadia parryi* ssp. *congdonii*	NL	NL	1B
Pappose tarplant	*Centromadia parryi* ssp. *parryi*	NL	NL	1B
Suisun thistle	*Cirsium hydrophilum* var. *hydrophilum*	E	NL	1B
Hispid bird's-beak	***Cordylanthus mollis* ssp. *mollis***	**NL**	**NL**	**1B**
Soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*	E	R	1B
Recurved larkspur	***Delphinium recurvatum***	**NL**	**NL**	**1B**
Dwarf downingia	***Downingia pusilla***	**NL**	**NL**	**2**
Mt. Diablo buckwheat	*Eriogonum truncatum*	NL	NL	1A
Fragrant fritillary	***Fritillaria liliacea***	**NL**	**NL**	**1B**
Adobe-lily	***Fritillaria pluriflora***	**NL**	**NL**	**1B**
Boggs Lake hedge-hyssop	***Gratiola heterosepala***	**NL**	**E**	**1B**
Brewer's western flax	*Hesperolinon breweri*	NL	NL	1B
Rose-mallow	*Hibiscus lasiocarpus*	NL	NL	2
Carquinez goldenbush	*Isocoma arguta*	NL	NL	1B
Northern California black walnut	*Juglans hindsii*	NL	NL	1B
Contra Costa goldfields	***Lasthenia conjugens***	**E**	**NL**	**1B**
Delta tule pea	*Lathyrus jepsonii* var. *jepsonii*	NL	NL	1B
Legenere	***Legenere limosa***	**NL**	**NL**	**1B**
Heckard's pepper-grass	*Lepidium latipes* var. *heckardii*	NL	NL	1B
Mason's lilaeopsis	*Lilaeopsis masonii*	NL	R	1B
Delta mudwort	*Limosella subulata*	NL	NL	2
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*	NL	NL	1B

Common Name	Scientific Name	Listing		
		ESA	*CESA*	*IREP*
Colusa grass	***Neostapfia colusana***	**T**	**E**	**1B**
San Joaquin Valley orcutt grass	*Orcuttia inaequalis*	T	E	1B
Bearded popcorn-flower	*Plagiobothrys hystriculus*	NL	NL	1A
Rayless ragwort	*Senecio aphanactis*	NL	NL	2
Showy Indian clover	***Trifolium amoenum***	**E**	**NL**	**1B**
Saline clover	*Trifolium depauperatum* var. *hydrophilum*	NL	NL	1B
Crampton's tuctoria (Solano grass)	***Tuctoria mucronata***	**E**	**E**	**1B**
Mammals				
Pallid bat	*Antrozous pallidus*	FSC	CSC	NL
Townsend's big-eared bat	*Corynorhinus townsendii*	FSC	CSC	NL
Western mastiff bat	*Eumops perotis*	NL	CSC	NL
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	E	E	FPS
Suisun shrew	*Sorex ornatus sinuosus*	FSC	CSC	NL
American badger	*Taxidea taxus*	NL	CSC	NL
Birds				
Cooper's hawk	*Accipiter cooperii*	NL	CSC	NL
Sharp-shinned hawk	*Accipiter striatus*	NL	CSC	NL
Tricolored blackbird	*Agelaius tricolor*	FSC	CSC	NL
Golden eagle	*Aquila chrysaetos*	NL	CSC	FPS
Short-eared owl	***Asio flammeus***	**FSC**	**CSC**	**NL**
Western burrowing owl	***Athene cunicularia hypugea***	**NL**	**CSC**	**NL**
Swainson's hawk	***Buteo swainsoni***	**NL**	**T**	**NL**
Mountain plover	*Charadrius montanus*	FPT	CSC	NL
Northern harrier	*Circus cyaneus*	NL	CSC	NL
White-tailed kite	***Elanus leucurus***	**NL**	**FPS**	**NL**
Saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	FSC	CSC	NL
Yellow-breasted chat	*Icteria virens*	NL	CSC	NL
Loggerhead shrike	***Lanius ludovicianus***	**NL**	**CSC**	**NL**
California black rail	*Laterallus jamaicensis coturniculus*	NL	T	NL
Suisun song sparrow	*Melospiza melodia maxillaries*	FSC	CSC	NL
San Pablo song sparrow	*Melospiza melodia samuelis*	NL	CSC	NL
Osprey	*Pandion haliaetus*	NL	CSC	NL
Brown pelican	*Pelecanus occidentalis*	NL	FPS	NL
California clapper rail	*Rallus longirostris obsoletus*	E	E	NL
Reptiles				
Western pond turtle	*Emys marmorata*	FSC	CSC	NL
Giant garter snake	***Thamnophis gigas***	**T**	**T**	**NL**

Common Name	Scientific Name	Listing		
		ESA	*CESA*	*IREP*
Amphibians				
California tiger salamander	***Ambystoma californiense***	**T**	**NL**	**NL**
California red-legged frog	***Rana aurora draytonii***	**T**	**NL**	**NL**
Foothill yellow-legged frog	*Rana boylii*	NL	CSC	NL
Invertebrates				
Conservancy fairy shrimp	***Branchinecta conservatio***	**E**	**NL**	**NL**
Vernal pool fairy shrimp	***Branchinecta lynchi***	**T**	**NL**	**NL**
Midvalley fairy shrimp	*Branchinecta mesovallensis*	FSC	NL	NL
Valley elderberry longhorn beetle	***Desmocerus californicus dimorphus***	**T**	**NL**	**NL**
Delta green ground beetle	***Elaphrus viridis***	**T**	**NL**	**NL**
Ricksecker's water scavenger beetle	***Hydrochara rickseckeri***	**FSC**	**NL**	**NL**
Vernal pool tadpole shrimp	***Lepidurus packardi***	**E**	**NL**	**NL**
Fish				
Chinook salmon - Winter-run	*Oncorhynchus tshawtyscha*	E	NL	NL
Chinook salmon-Central Valley (fall/late fall-run evolutionarily significant unit [ESU])	*Oncorhynchus tshawtyscha*	C	NL	NL
Chinook salmon - Spring-run	*Oncorhynchus tshawtyscha*	T	NL	NL
Steelhead - Central California (Coast ESU)	*Oncorhynchus mykiss*	T	NL	NL
Delta smelt	*Hypomesus transpacificus*	T	T	NL
Sacramento splittail	*Pogonichtys macrolepidotus*	T	NL	NL

FE = Federal endangered FT = Federal threatened FSC = Federal species of concern
SE = state endangered ST = state threatened CSC = state species of concern
N1B = considered rare or endangered in California; not legally protected under the ESA or CESA
N2 = considered rare or endangered in California, but more common elsewhere
FPS = California fully protected species
NL = not listed
N/A = not applicable
Sources: Solano County 2006b; USAF 2003a.

APPENDIX L

ENVIRONMENTAL RESTORATION PROGRAM (ERP) SITES AT TRAVIS AFB

Appendix L

Environmental Restoration Program (ERP) Sites at Travis Air Force Base

Site No.	Site Name	Distance from Outgrant Area	Contaminated Media	Primary Activity Resulting in Contamination	Status
LF044	Landfill X	Partially Located within Outgrant Area	Soil	Solid Waste Disposal	Land use and access restrictions implemented
DP039	Building 755	<0.25 Mile	Both	Sump/Sewer/ Surface Water Disposal	Land use and access restrictions implemented; groundwater remediation in progress
SS046	Railhead Munitions Staging Area	<0.25 Mile	Soil	Munitions Transport	Land use and access restrictions implemented
FT002	Fire Training Area 1	0.25 - 1.0 Mile	Soil	Fire Training	NFA needed
LF008	Landfill 3	0.25 - 1.0 Mile	Both	Solid Waste Disposal	Groundwater remediation in progress; soil cleanup achieved
RW013	Low-Level Radioactive Burial Site 2	0.25 - 1.0 Mile	Soil	Solid Waste Disposal	Site closed, May 2004
SD033 (Site 1)	Storm Sewer System II	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	Groundwater remediation in progress; soil excavation proposed
SD033 (Site 2)	Storm Sewer System II	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	Groundwater remediation in progress; soil excavation proposed
SD033 (Site 3)	Storm Sewer System II	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	Groundwater remediation in progress; soil excavation proposed
SD034	Building 811	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	NFA for soil; groundwater remediation in progress
SD036	Buildings 872/873/876	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	NFA for soil; groundwater remediation in progress

Site No.	Site Name	Distance from Outgrant Area	Contaminated Media	Primary Activity Resulting in Contamination	Status
SD037	800 Area Sanitary Sewer	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	Land use and access restrictions implemented; groundwater remediation in progress
SD042	Buildings 929/931/940	0.25 - 1.0 Mile	Soil	Hazardous Waste Storage	Site closed, Jun 2005
SD043	Building 916	0.25 - 1.0 Mile	Both	Leaky Transformer	Land use and access restrictions implemented; groundwater remediation in progress
SS014	Former Jet Fuel Spill Area	0.25 - 1.0 Mile	Groundwater	Petroleum Pipeline Leak	Groundwater remediation in progress
SS015	Solvent Spill Area	0.25 - 1.0 Mile	Both	Operational/ Maintenance	Land use and access restrictions implemented; groundwater remediation proposed
SS016	Oil Spill Area	0.25 - 1.0 Mile	Both	Hazardous Waste Storage	Land use and access restrictions implemented; groundwater remediation in progress
SS035	Buildings 818/819	0.25 - 1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	NFA for soil; groundwater remediation in progress
SS041	Building 905	0.25 - 1.0 Mile	Both	Operational/ Maintenance	Soil excavated in Dec 2000; site closed
ST018	North/South Gas Station (USTs)	0.25 - 1.0 Mile	Soil	Leaky UST	Tanks removed; remediation in progress; site closure proposed
ST027	TF-33 Test Stand Area	0.25 - 1.0 Mile	Both	Operational/ Maintenance	groundwater and soil remediation in progress
FT003	Fire Training Area 2	>1.0 Mile	Soil	Fire Training	Soil excavation proposed
FT004	Fire Training Area 3	>1.0 Mile	Both	Fire Training	Groundwater remediation in progress; soil excavation proposed

Site No.	Site Name	Distance from Outgrant Area	Contaminated Media	Primary Activity Resulting in Contamination	Status
FT005	Fire Training Area 4	>1.0 Mile	Both	Fire Training	Groundwater remediation in progress; soil excavation proposed
LF006	Landfill 1	>1.0 Mile	Groundwater	Solid Waste Disposal	Groundwater remediation in progress
LF007	Landfill 2	>1.0 Mile	Both	Solid Waste Disposal	Majority of the former landfill was capped in 2002; soil excavation proposed
OT010	Sludge Disposal Area	>1.0 Mile	Soil	Sump/Sewer/ Surface Water Disposal	NFA needed
OT011	Cyanide Disposal Pit	>1.0 Mile	None Observed	Solid Waste Disposal	NFA needed
SD001	Union Creek Storm Sewer System	>1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	Groundwater remediation in progress; soil excavation proposed
SD031	Building 1205	>1.0 Mile	Groundwater	Operational/ Maintenance	Groundwater remediation in progress
SD033 (Site 4)	Storm Sewer System II	>1.0 Mile	Both	Sump/Sewer/ Surface Water Disposal	Groundwater remediation in progress; soil excavation proposed
SD045	Former Small Arms Range	>1.0 Mile	Soil	Munitions Training	Soil excavation proposed
SS014	Former Jet Fuel Spill Area	>1.0 Mile	Groundwater	Petroleum Pipeline Leak	Groundwater remediation in progress
SS029	Monitoring Well 329	>1.0 Mile	Both	Operational/ Maintenance	NFA for soil; groundwater remediation in progress
SS030	Monitoring Well 269	>1.0 Mile	Both	Operational/ Maintenance	NFA for soil; groundwater remediation in progress
ST028	Buildings 363/1021 (USTs)	>1.0 Mile	Groundwater	Leaky UST	Tanks removed; groundwater remediation in progress

Site No.	Site Name	Distance from Outgrant Area	Contaminated Media	Primary Activity Resulting in Contamination	Status
ST032	Monitoring Wells 107 and 246	>1.0 Mile	Both	Operational/ Maintenance	Land use and access restrictions implemented; groundwater remediation in progress
WP017	Inactive Oxidation Ponds	>1.0 Mile	Soil	Sump/Sewer/ Surface Water Disposal	NFA needed

Sources: USAF 2006b, 2008h.

APPENDIX M

AIR QUALITY STUDY—CALCULATIONS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	Travis AFB Jet Tank
City:	Travis AFB
State:	CA
Company:	Travis
Type of Tank:	Internal Floating Roof Tank
Description:	24 Turns
Tank Dimensions	
Diameter (ft):	155.00
Volume (gallons):	6,300,000.00
Turnovers:	24.00
Self Supp. Roof? (y/n):	N
No. of Columns:	9.00
Eff. Col. Diam. (ft):	1.00
Paint Characteristics	
Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Rim-Seal System	
Primary Seal:	Mechanical Shoe
Secondary Seal	Rim-mounted
Deck Characteristics	
Deck Fitting Category:	Detail
Deck Type:	Welded

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1
Automatic Gauge Float Well/Bolted Cover, Gasketed	1
Roof Leg or Hanger Well/Adjustable	41
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve	1
Column Well (24-in. Diam.)/Pipe Col.-Sliding Cover, Gask.	9
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Unslotted Guide-Pole Well/Gasketed Sliding Cover	1

Meterological Data used in Emissions Calculations: Sacramento, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Travis AFB Jet Tank - Internal Floating Roof Tank
Travis AFB, CA

Annual Emission Calcaulations

Rim Seal Losses (lb):	1.8952
Seal Factor A (lb-mole/ft-yr):	0.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.4000
Value of Vapor Pressure Function:	0.0002
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0092
Tank Diameter (ft):	155.0000
Vapor Molecular Weight (lb/lb-mole):	130.0000
Product Factor:	1.0000
Withdrawal Losses (lb):	243.3234
Number of Columns:	9.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	151,200,000.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	7.0000
Tank Diameter (ft):	155.0000
Deck Fitting Losses (lb):	13.5208
Value of Vapor Pressure Function:	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	663.5000
Deck Seam Losses (lb):	0.0000
Deck Seam Length (ft):	0.0000
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.0000
Deck Seam Length Factor(ft/sqft):	0.0000
Tank Diameter (ft):	155.0000
Vapor Molecular Weight (lb/lb-mole):	130.0000
Product Factor:	1.0000
Total Losses (lb):	258.7394

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Bolted Cover, Gasketed	1	1.60	0.00	0.00	0.0326
Automatic Gauge Float Well/Bolted Cover, Gasketed	1	2.80	0.00	0.00	0.0571
Roof Leg or Hanger Well/Adjustable	41	7.90	0.00	0.00	6.6004
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	0.1263
Slotted Guide-Pole/Sample Well/Gask. Sliding Cover, w. Pole Sleeve	1	11.00	46.00	1.40	0.2242
Column Well (24-in. Diam.)/Pipe Col.-Sliding Cover, Gask.	9	25.00	0.00	0.00	4.5850
Ladder Well (36-in. Diam.)/Sliding Cover, Gasketed	1	56.00	0.00	0.00	1.1412
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	0.2445
Unslotted Guide-Pole Well/Gasketed Sliding Cover	1	25.00	13.00	2.20	0.5094

TANKS 4.0.9d

Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Travis AFB Jet Tank - Internal Floating Roof Tank
Travis AFB, CA

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Jet kerosene	1.90	243.32	13.52	0.00	258.74
Hexane (-n)	0.03	0.01	0.19	0.00	0.23
Benzene	0.01	0.01	0.09	0.00	0.12
Toluene	0.12	0.32	0.88	0.00	1.32
Ethylbenzene	0.04	0.31	0.28	0.00	0.63
Xylene (-m)	0.08	0.75	0.57	0.00	1.40
Unidentified Components	1.61	241.91	11.52	0.00	255.05

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Travis Tote
City:	Sacramento
State:	CA
Company:	Travis
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):		5.00
Diameter (ft):		3.65
Volume (gallons):		350.00
Turnovers:		52.00
Net Throughput(gal/yr):		18,200.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Sacramento, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Travis Tote - Horizontal Tank
Sacramento, CA

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
FSII	All	62.90	56.46	69.34	60.81	0.0040	0.0040	0.0040	76.0000			76.00	Option 1: VP60 = .004 VP70 = .004

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Travis Tote - Horizontal Tank
Sacramento, CA

Annual Emission Calcaulations	
Standing Losses (lb):	0.0298
Vapor Space Volume (cu ft):	33.3231
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0452
Vented Vapor Saturation Factor:	0.9996
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	33.3231
Tank Diameter (ft):	3.6500
Effective Diameter (ft):	4.8217
Vapor Space Outage (ft):	1.8250
Tank Shell Length (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	76.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Daily Avg. Liquid Surface Temp. (deg. R):	522.5708
Daily Average Ambient Temp. (deg. F):	60.7917
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	520.4817
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,562.1317
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0452
Daily Vapor Temperature Range (deg. R):	25.7597
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0040
Daily Avg. Liquid Surface Temp. (deg R):	522.5708
Daily Min. Liquid Surface Temp. (deg R):	516.1309
Daily Max. Liquid Surface Temp. (deg R):	529.0107
Daily Ambient Temp. Range (deg. R):	25.4500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9996
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0040
Vapor Space Outage (ft):	1.8250
Working Losses (lb):	0.0980
Vapor Molecular Weight (lb/lb-mole):	76.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Annual Net Throughput (gal/yr.):	18,200.0000

Annual Turnovers:	52.0000
Turnover Factor:	0.7436
Tank Diameter (ft):	3.6500
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.1278

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Travis Tote - Horizontal Tank
Sacramento, CA

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
FSII	0.10	0.03	0.13

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Travis AFB Additives
City:	
State:	CA
Company:	KMEP
Type of Tank:	Vertical Fixed Roof Tank
Description:	

Tank Dimensions

Shell Height (ft):	15.00
Diameter (ft):	12.00
Liquid Height (ft) :	11.00
Avg. Liquid Height (ft):	5.00
Volume (gallons):	8,460.30
Turnovers:	52.00
Net Throughput(gal/yr):	439,935.40
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	0.38
Slope (ft/ft) (Cone Roof)	0.06

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Sacramento, California (Avg Atmospheric Pressure = 14.72 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Travis AFB Additives - Vertical Fixed Roof Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
FSII	All	62.90	56.46	69.34	60.81	0.0040	0.0040	0.0040	76.0000			76.00	Option 1: VP60 = .004 VP70 = .004

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Travis AFB Additives - Vertical Fixed Roof Tank

Annual Emission Calcaulations	
Standing Losses (lb):	1.0225
Vapor Space Volume (cu ft):	1,145.2990
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0452
Vented Vapor Saturation Factor:	0.9979
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,145.2990
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1267
Tank Shell Height (ft):	15.0000
Average Liquid Height (ft):	5.0000
Roof Outage (ft):	0.1267
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1267
Roof Height (ft):	0.3800
Roof Slope (ft/ft):	0.0600
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	76.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Daily Avg. Liquid Surface Temp. (deg. R):	522.5708
Daily Average Ambient Temp. (deg. F):	60.7917
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	520.4817
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,562.1317
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0452
Daily Vapor Temperature Range (deg. R):	25.7597
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0040
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0040
Daily Avg. Liquid Surface Temp. (deg R):	522.5708
Daily Min. Liquid Surface Temp. (deg R):	516.1309
Daily Max. Liquid Surface Temp. (deg R):	529.0107
Daily Ambient Temp. Range (deg. R):	25.4500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9979
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0040
Vapor Space Outage (ft):	10.1267

Working Losses (lb):	2.3678
Vapor Molecular Weight (lb/lb-mole):	76.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0040
Annual Net Throughput (gal/yr.):	439,935.4040
Annual Turnovers:	52.0000
Turnover Factor:	0.7436
Maximum Liquid Volume (gal):	8,460.2962
Maximum Liquid Height (ft):	11.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	3.3903

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Travis AFB Additives - Vertical Fixed Roof Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
FSII	2.37	1.02	3.39

Project	Alt 1 Pipeline	Activity			
Travis AFB		Earthwork	633,600	sq ft ROW area	average of 75 ft
			5,632	cu yd cut/fill	
Schedule:	42.24	days	at 100 ft per day		

Equipment Type	No. of Units	Hours/Day
Bulldozer	1	8
Scrapper	1	8
Excavator	1	8
Compactor	1	8

Emission Factors Equipment Type	CO lbs/hr	NOx lbs/hr	PM10 lbs/hr	SOx lbs/hr	VOC lbs/hr
Bulldozer	1.024	2.817	0.112	0.452	0.211
Scrapper	0.816	2.839	0.114	0.496	0.207
Excavator	0.472	1.138	0.06	0.243	0.097
Compactor	0.026	0.039	0.002	0	0.009

Construction Vehicle Mobile Source Emission Factors

Equipment Type	CO lbs/mile	NOx lbs/mile	PM10 lbs/mile	SOx lbs/mile	VOC lbs/mile
Heavy Duty Truck	0.005520326	0.035634629	0.000644071	4.57211E-05	0.001226518

Vehicle	No. of One-Way Trips/Day	One WayTrip Length (miles)	
Water Truck	3	4	Assumes a 6' wide water truck traverses 1/4 mile x 100 ft strip 3 times per day

Emissions Equipment	CO lbs/day	NOx lbs/day	PM10 lbs/day	SOx lbs/day	VOC lbs/day
Bulldozer	8.19	22.54	0.90	3.62	1.69
Scrapper	6.53	22.71	0.91	3.97	1.66
Excavator	3.78	9.10	0.48	1.94	0.78
Compactor	0.21	0.31	0.02	-	0.07
Water Truck	0.14	0.91	0.02	0.00	0.03
Worker Vehicles	51.09	44.45	0.88	0.07	6.73
Fugitive Emissions			121.33		
TOTAL (lbs/day)	69.93	100.02	124.53	9.60	10.96

Project	Alt 1 Pipeline	Activity	
Travis AFB		Pipeline Installation	633,600 sq ft

Schedule: 42.24 days

Equipment Type	No. of Units	Hours/Day
Pipe Stringing Trucks	2	8
HDD	1	8
Welding Racks	3	8
Boom Truck	1	8
Tractor (Backfill)	1	8
Welding Truck	1	8
Ex-Ray Truck	1	8

Emission Factors Equipment Type	CO lbs/hr	NOx lbs/hr	PM10 lbs/hr	SOx lbs/hr	VOC lbs/hr
Pipe Stringing Trucks	0.641	2.731	0.096	0.494	0.187
HDD	0.754	1.021	0.053	0.002	0.105
Welding Racks	0.232	0.318	0.034	0.0003	0.079
Boom Truck	0.641	2.731	0.096	0.494	0.187
Tractor (Backfill)	0.695	1.953	0.095	0.31	0.169
Welding Truck	0.641	2.731	0.096	0.494	0.187
Ex-Ray Truck	0.641	2.731	0.096	0.494	0.187

Construction Vehicle Mobile Source Emission Factors

Equipment Type	CO lbs/mile	NOx lbs/mile	PM10 lbs/mile	SOx lbs/mile	VOC lbs/mile
Heavy Duty Truck	0.005520326	0.035634629	0.000644071	4.57211E-05	0.001226518
Light Duty Trucks	0.017455	0.024978	0.000439664	0.000033	0.002608

Vehicle	No. of One-Way Trips/Day	One WayTrip Length (miles)	
Pick-Up Trucks	4	2	Each of 4 pick-up trucks traverses the site daily
Water Truck	3	4	Assumes a 6' wide water truck traverses 1/4 mile x 100 ft strip 3 times per da

Emissions Equipment	CO lbs/day	NOx lbs/day	PM10 lbs/day	SOx lbs/day	VOC lbs/day
Pipe Stringing Trucks	10.26	43.70	1.54	7.90	2.99
HDD	6.03	8.17	0.42	0.01	0.84
Welding Racks	5.57	7.63	0.82	0.01	1.90
Boom Truck	5.13	21.85	0.77	3.95	1.50
Tractor (Back fill)	5.56	15.62	0.76	2.48	1.35
Welding Truck	5.13	21.85	0.77	3.95	1.50
Ex-Ray Truck	5.13	21.85	0.77	3.95	1.50
Pick-up Trucks	0.28	0.40	0.01	0.00	0.04
Water Truck	0.14	0.91	0.02	0.00	0.03
Worker Vehicles	51.09	44.45	0.88	0.07	6.73
TOTAL (lbs/day)	94.31	186.42	6.74	22.33	18.38

Project	Alt 2 Pipeline	Activity			
Travis AFB		Earthwork	633,600	sq ft ROW area	average of 75 ft
			5,632	cu yd cut/fill	
Schedule:	84.48	days	at 100 ft per day		

Equipment Type	No. of Units	Hours/Day
Bulldozer	1	8
Scrapper	1	8
Excavator	1	8
Compactor	1	8

Emission Factors Equipment Type	CO lbs/hr	NOx lbs/hr	PM10 lbs/hr	SOx lbs/hr	VOC lbs/hr
Bulldozer	1.024	2.817	0.112	0.452	0.211
Scrapper	0.816	2.839	0.114	0.496	0.207
Excavator	0.472	1.138	0.06	0.243	0.097
Compactor	0.026	0.039	0.002	0	0.009

Construction Vehicle Mobile Source Emission Factors

Equipment Type	CO lbs/mile	NOx lbs/mile	PM10 lbs/mile	SOx lbs/mile	VOC lbs/mile
Heavy Duty Truck	0.005520326	0.035634629	0.000644071	4.57211E-05	0.001226518

Vehicle	No. of One-Way Trips/Day	One WayTrip Length (miles)	
Water Truck	3	4	Assumes a 6' wide water truck traverses 1/4 mile x 100 ft strip 3 times per day

Emissions Equipment	CO lbs/day	NOx lbs/day	PM10 lbs/day	SOx lbs/day	VOC lbs/day
Bulldozer	8.19	22.54	0.90	3.62	1.69
Scrapper	6.53	22.71	0.91	3.97	1.66
Excavator	3.78	9.10	0.48	1.94	0.78
Compactor	0.21	0.31	0.02	-	0.07
Water Truck	0.14	0.91	0.02	0.00	0.03
Worker Vehicles	51.09	44.45	0.88	0.07	6.73
Fugitive Emissions			113.47		
TOTAL (lbs/day)	69.93	100.02	116.66	9.60	10.96

Project	Alt 2 Pipeline	Activity	
Travis AFB		Pipeline Installation	633,600 sq ft

Schedule: 84.48 days

Equipment Type	No. of Units	Hours/Day
Pipe Stringing Trucks	2	8
Welding Racks	3	8
Boom Truck	1	8
Tractor (Backfill)	1	8
Welding Truck	1	8
Ex-Ray Truck	1	8

Emission Factors Equipment Type	CO lbs/hr	NOx lbs/hr	PM10 lbs/hr	SOx lbs/hr	VOC lbs/hr
Pipe Stringing Trucks	0.641	2.731	0.096	0.494	0.187
Welding Racks	0.232	0.318	0.034	0	0.079
Boom Truck	0.641	2.731	0.096	0.494	0.187
Tractor (Backfill)	0.695	1.953	0.095	0.31	0.169
Welding Truck	0.641	2.731	0.096	0.494	0.187
Ex-Ray Truck	0.641	2.731	0.096	0.494	0.187

Construction Vehicle Mobile Source Emission Factors

Equipment Type	CO lbs/mile	NOx lbs/mile	PM10 lbs/mile	SOx lbs/mile	VOC lbs/mile
Heavy Duty Truck	0.005520326	0.035634629	0.000644071	4.57211E-05	0.001226518
Light Duty Trucks	0.017455	0.024978	0.000439664	0.000033	0.002608

Vehicle	No. of One-Way Trips/Day	One WayTrip Length (miles)	
Pick-Up Trucks	4	2	Each of 4 pick-up trucks traverses the site daily
Water Truck	3	4	Assumes a 6' wide water truck traverses 1/4 mile x 100 ft strip 3 times per day

Emissions Equipment	CO lbs/day	NOx lbs/day	PM10 lbs/day	SOx lbs/day	VOC lbs/day
Pipe Stringing Trucks	10.26	43.70	1.54	7.90	2.99
Welding Racks	5.57	7.63	0.82	-	1.90
Boom Truck	5.13	21.85	0.77	3.95	1.50
Tractor (Back fill)	5.56	15.62	0.76	2.48	1.35
Welding Truck	5.13	21.85	0.77	3.95	1.50
Ex-Ray Truck	5.13	21.85	0.77	3.95	1.50
Pick-up Trucks	0.28	0.40	0.01	0.00	0.04
Water Truck	0.14	0.91	0.02	0.00	0.03
Worker Vehicles	51.09	44.45	0.88	0.07	6.73
TOTAL (lbs/day)	88.28	178.25	6.32	22.31	17.54

Project	Alt 3 Pipeline	Activity		
Travis AFB		Earthwork	844,800	sq ft ROW area
			-	cu yd cut/fill
Schedule:	28.16	days	at 300 ft per day	

Equipment Type	**No. of Units**	**Hours/Day**
Bulldozer	1	8
Scrapper	1	8
Excavator	1	8
Compactor	1	8

Emission Factors	**CO**	**NOx**	**PM10**	**SOx**	**VOC**
Equipment Type	**lbs/hr**	**lbs/hr**	**lbs/hr**	**lbs/hr**	**lbs/hr**
Bulldozer	1.024	2.817	0.112	0.452	0.211
Scrapper	0.816	2.839	0.114	0.496	0.207
Excavator	0.472	1.138	0.06	0.243	0.097
Compactor	0.026	0.039	0.002	0	0.009

Construction Vehicle Mobile Source Emission Factors

Equipment Type	**CO lbs/mile**	**NOx lbs/mile**	**PM10 lbs/mile**	**SOx lbs/mile**	**VOC lbs/mile**
Heavy Duty Truck	0.005520326	0.035634629	0.000644071	4.57211E-05	0.001226518

Vehicle	**No. of One-Way Trips/Day**	**One WayTrip Length (miles)**	
Water Truck	3	4	Assumes a 6' wide water truck traverses 1/4 mile x 100 ft strip 3 times per day

Emissions	**CO**	**NOx**	**PM10**	**SOx**	**VOC**
Equipment	**lbs/day**	**lbs/day**	**lbs/day**	**lbs/day**	**lbs/day**
Bulldozer	8.19	22.54	0.90	3.62	1.69
Scrapper	6.53	22.71	0.91	3.97	1.66
Excavator	3.78	9.10	0.48	1.94	0.78
Compactor	0.21	0.31	0.02	-	0.07
Water Truck	0.14	0.91	0.02	0.00	0.03
Worker Vehicles	51.09	44.45	0.88	0.07	6.73
Fugitive Emissions			140.80		
TOTAL (lbs/day)	69.93	100.02	144.00	9.60	10.96

Project	Alt 3 Pipeline	Activity	
Travis AFB		Pipeline Installation	844,800 sq ft

Schedule: 28.16 days

Equipment Type	No. of Units	Hours/Day
Pipe Stringing Trucks	2	8
Welding Racks	3	8
Boom Truck	1	8
Welding Truck	1	8
Ex-Ray Truck	1	8

Emission Factors Equipment Type	CO lbs/hr	NOx lbs/hr	PM10 lbs/hr	SOx lbs/hr	VOC lbs/hr
Pipe Stringing Trucks	0.641	2.731	0.096	0.494	0.187
Welding Racks	0.232	0.318	0.034	0	0.079
Boom Truck	0.641	2.731	0.096	0.494	0.187
Welding Truck	0.641	2.731	0.096	0.494	0.187
Ex-Ray Truck	0.641	2.731	0.096	0.494	0.187

Construction Vehicle Mobile Source Emission Factors

Equipment Type	CO lbs/mile	NOx lbs/mile	PM10 lbs/mile	SOx lbs/mile	VOC lbs/mile
Heavy Duty Truck	0.005520326	0.035634629	0.000644071	4.57211E-05	0.001226518
Light Duty Trucks	0.017455	0.024978	0.000439664	0.000033	0.002608

Vehicle	No. of One-Way Trips/Day	One WayTrip Length (miles)	
Pick-Up Trucks	4	2	Each of 4 pick-up trucks traverses the site daily
Water Truck	3	4	Assumes a 6' wide water truck traverses 1/4 mile x 100 ft strip 3 times per da

Emissions Equipment	CO lbs/day	NOx lbs/day	PM10 lbs/day	SOx lbs/day	VOC lbs/day
Pipe Stringing Trucks	10.26	43.70	1.54	7.90	2.99
Welding Racks	5.57	7.63	0.82	-	1.90
Boom Truck	5.13	21.85	0.77	3.95	1.50
Welding Truck	5.13	21.85	0.77	3.95	1.50
Ex-Ray Truck	5.13	21.85	0.77	3.95	1.50
Pick-up Trucks	0.28	0.40	0.01	0.00	0.04
Water Truck	0.14	0.91	0.02	0.00	0.03
Worker Vehicles	51.09	44.45	0.88	0.07	6.73
TOTAL (lbs/day)	82.72	162.63	5.56	19.83	16.18

APPENDIX N

BIOLOGICAL ASSESSMENT (BA)

FINAL

BIOLOGICAL ASSESSMENT

JP-8 PIPELINE AND TERMINAL AT TRAVIS AIR FORCE BASE, SOLANO COUNTY, CALIFORNIA

Department of the Air Force
60th Civil Engineer Squadron
Travis Air Force Base, California

July 2009

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LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

AMEC	AMEC Earth & Environmental, Inc.
APSA	California Aboveground Petroleum Storage Act
BA	Biological Assessment
BBL	barrel
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Register
CNDDB	California Natural Diversity Database
CP	cathodic protection
CWA	Clean Water Act
DESC	Defense Energy Support Center
DOT	Department of Transportation
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAC	facultative
FACU	facultative upland
FACW	facultative wetland
GIS	geographic information system
HDD	horizontal directional drilling
ICP	Integrated Contingency Plan
OBL	obligate
PG&E	Pacific Gas & Electric
PHMSA	Pipeline and Hazardous Materials Safety Administration
ROD	Record of Decision

SARA	Superfund Amendments and Reauthorization Act of 1986
SCADA	Supervisory Control and Data Acquisition
SFPP	SFPP, L.P., operating partnership of Kinder Morgan Energy Partners, L.P.
SPCC	Spill Prevention Control and Countermeasure
Travis AFB	Travis Air Force Base
UPL	upland
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service
WABOU	West/Annexes/Basewide Operable Unit

1.0 INTRODUCTION

1.1 Purpose and Need of the Proposed Action

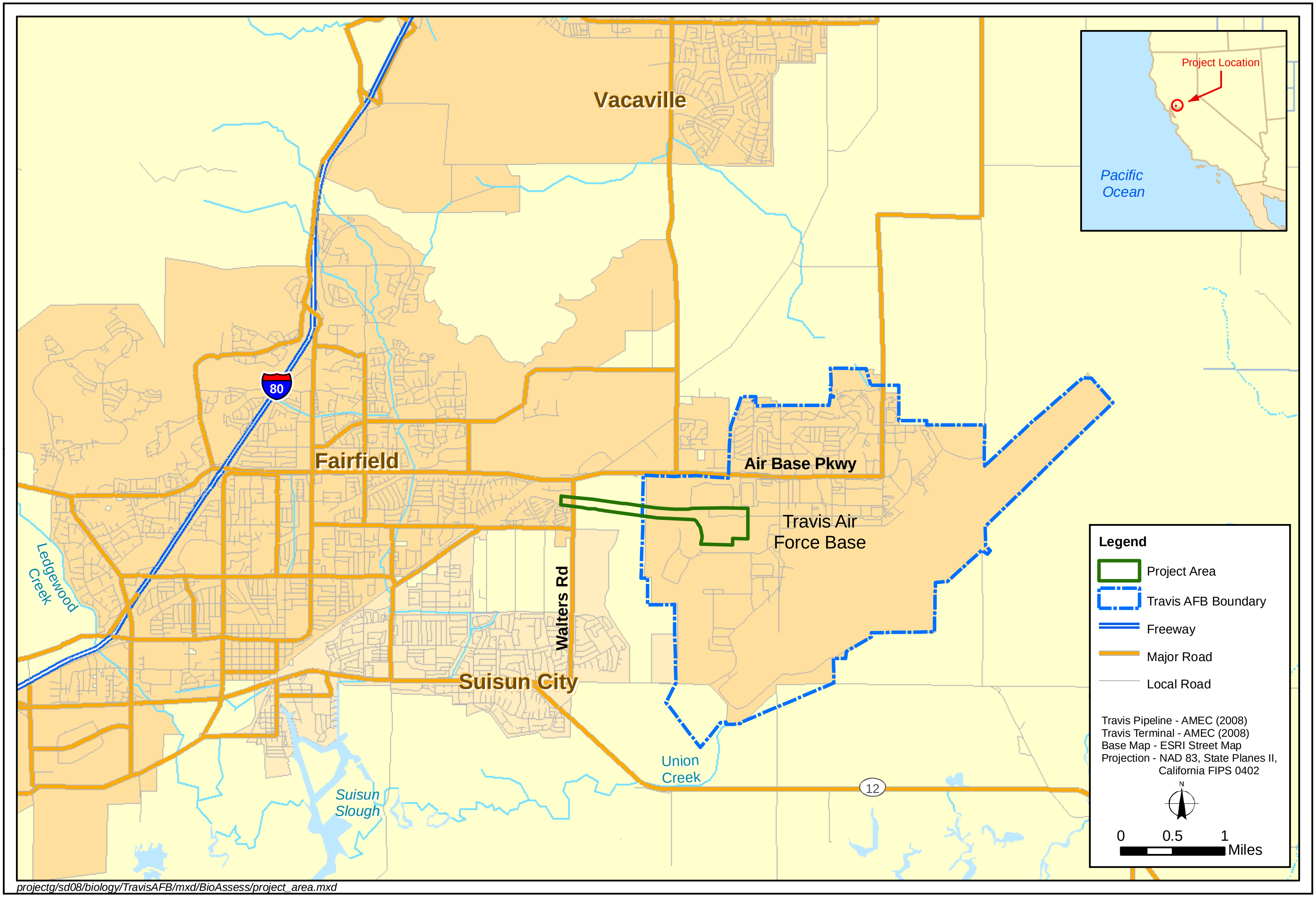
The Defense Energy Support Center (DESC) has requested that SFPP, L.P., operating partnership of Kinder Morgan Energy Partners, L.P. (SFPP) build, own, operate and maintain a JP-8 jet fuel storage facility to be located at Travis Air Force Base (AFB). This facility would consist of three 150,000 barrel (BBL) tanks, filtration system, injection system, metering, pipelines and pumping system. The facility would connect to the existing SFPP Concord to Sacramento 20-inch pipeline to ship jet fuel to Travis AFB. This facility would provide Travis AFB with an “on demand” jet fuel supply and allow the base to decommission the older 8-inch pipeline that is reaching the end of its operational life-span. Figure 1 shows the general location of the Proposed Action at Travis AFB, Solano County, California within Township 5 North, Range 1 West, Section 21 and Section 22 of the Elmira 7.5-minute quadrangle.

The purpose of this Biological Assessment (BA) is to summarize the results of surveys and existing resource information to determine if threatened, endangered, proposed, candidate, or other special-status species or critical habitat that may occur in the project area are likely to be adversely affected by construction of the project. This BA has been prepared according to the legal requirements set forth under Section 7 of the Endangered Species Act (ESA) (16 U.S.C. 1536 [c]).

1.2 Section 7 Consultation

Travis AFB personnel met with United States Fish and Wildlife Service (USFWS) staff to discuss base projects, including the Proposed Action, on April 2, 2008. SFPP representatives had telephone and email contact with USFWS on April 4, 2008 regarding the Proposed Action. Travis AFB personnel and SFPP representatives attended meetings with USFWS staff regarding the Proposed Action on July 31, 2008, December 3, 2008, May 20, 2009, and June 10, 2009. Informal discussions included project construction information and requirements, potential species impacts, avoidance measures, and mitigation requirements for unavoidable impacts. In accordance with 50 Code of Federal Register (CFR) 402.12 (c), a species list was obtained from the USFWS Sacramento Ecological Services Field Office (via an online query system) on February 25, 2008 and updated January 5, 2009.

This BA considers how the Proposed Action (described in Section 2) may affect federally listed and proposed endangered and threatened species, critical habitat, and recovery efforts within the Action Area. Section 3 provides a description of the Action Area. Section 4 discusses the listed species associated with the Action Area. Section 5 includes an analysis of the direct and indirect effects of the Proposed Action on species and/or critical habitat, along with descriptions of conservation measures designed to reduce those effects. Section 6 offers concluding statements, and Section 7 provides references used to obtain the Proposed Action description and to assess effects of the Proposed Action on listed species.



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General Location of Proposed Action
JP-8 Pipeline and Terminal at Travis AFB

FIGURE
1

2.0 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action at Travis AFB is comprised of the following construction components as identified in Figure 2 and further described in Section 2.1:

- **Travis Terminal** – installation of three 150,000 BBL breakout tanks, equipment area, containment structures, and access roads.
- **Travis Pipeline** – installation of a 16-inch pipeline below ground approximately 6,800 feet, connecting the proposed Travis Terminal to the existing SFPP 20-inch pipeline along Walters Road, entirely within Travis AFB property boundaries. Additionally, routing of a 10-inch pipeline below ground approximately 2,300 feet along Hangar Avenue to connect the proposed Travis Terminal to the existing terminal to the east.
- **Travis Junction** – includes a tie-in of the proposed 16-inch pipeline to the existing SFPP 20-inch pipeline and a permanent pipeline control and maintenance facility. The control and maintenance facility would contain an above-grade 20-inch valve, three 16-inch valves, associated piping equipment for maintenance, pipeline controls, and a small parking area.

2.1 Construction Activities

For the purposes of this BA, construction activities are divided into five categories: Travis Terminal, Travis Pipeline, Travis Junction, staging and access areas, and utility infra-structure installation. The total construction footprint of the project includes 23.98 acres, as identified in Table 1.

2.1.1 Travis Terminal

The Travis Terminal would be located west of the existing Travis tank farm within a disturbed area used for equipment training and stockpiling of construction debris (Environmental Restoration Program [ERP] Site LF044) (Figure 2). Access to the Travis Terminal would come from existing roadways within Travis AFB, including Hangar Avenue to the north of the proposed area. A road would be constructed south from Hangar Avenue to the proposed facility and a temporary staging area would be placed adjacent to the new roadway. Construction activities would include:

- Existing on-site construction debris within ERP Site LF044 would be excavated and hauled to an approved facility for disposal;
- The area would be graded and leveled in preparation for facility construction;
- Bermed containment areas would be constructed around tanks and equipment area;
- The containment areas would be surrounded by an access and maintenance road;

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Proposed Action
JP-8 Pipeline and Terminal at Travis AFB

FIGURE
2

Table 1. Construction Activities and Disturbance Acreages

Construction Activity	Description	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Travis Terminal	Containment for tank and equipment area	0	11.31
	Access and maintenance road surrounding facility	0.77	2.13
Travis Pipeline	Horizontal Directional Drilling (entry and exit point staging areas)	0.90	0
	Conventional trenching (unpaved areas)	4.21	0
	Conventional trenching (paved areas)	2.48	0
Travis Junction	Maintenance facility and tie-in to existing 20-inch pipeline	0.11	0.17
Staging Areas	Area north of Travis Terminal	1.30	0
	Area west of Walters Road	0.6	0
Utility Infrastructure	Travis Junction	0	0.001
	Travis Pipeline	0	0
	Travis Terminal	0	0
Total Disturbance Area		10.37	13.61

- The Travis Terminal would include three 150,000 BBL working capacity breakout tanks (155 feet in diameter by 55 feet high) with an approved leak detection system in place;
- The equipment area would include relief valves, meters, transfer pumps, filter separators, 100 BBL steel drain sump, fire protection equipment, power supply, and communications system.

Design drawings of the proposed Travis Terminal are included in Appendix A. Excavation and grading limits for the Travis Terminal were established through conservative conceptual designs. The proposed disturbance area for grading includes 14.21 acres with permanent above-ground facilities (tank and equipment facilities, containment areas, and maintenance roads) occurring in 13.44 acres (Figure 2).

An Ecological Preserve containing vernal pool habitat was established by Travis AFB north of the proposed Travis Terminal (Figure 2). The Ecological Preserve is surrounded along its southern and western edge by a constructed berm designed as part of ERP activities to re-route surface water flows away from the vernal pool complex. Alteration of stormwater flows for the new terminal, therefore, is unlikely to affect the surface hydrology of the vernal pools.

2.1.2 Travis Pipeline

Detailed descriptions of construction activities at the Travis Pipeline are included in Appendix B. Construction of the Travis Pipeline consists of installing approximately 6,800 feet of 16-inch pipe entirely within Travis AFB property to connect the proposed Travis Terminal with the existing SFPP 20-inch pipeline at Walters Road (Figure 2). The Proposed Action also includes installation of approximately 2,300 feet of 10-inch pipe along the southern edge of Hangar Avenue to the existing terminal east of the proposed Travis Terminal (Figure 2). Pipeline construction activities would include a combination of conventional trenching and use of horizontal directional drilling (HDD) and slick bore techniques to avoid sensitive resources (Figure 3). The existing railroad tracks and railroad ties may be removed and the bed may be used as an access road during construction and during future maintenance operations.

2.1.2.1 Horizontal Directional Drilling

HDD would be used to install the 16-inch pipeline beneath sensitive habitats, including an Ecological Preserve on Travis AFB and an area of vernal pool complexes west of Travis AFB, a total of approximately 5,350 feet in length (Figure 2).

HDD involves the use of an electronically guided drill head to cut a pilot hole below ground between two points at the surface (entry and exit points). A series of progressively larger reamers are then attached to the drill string and pulled through the pilot hole until the size is large enough to pull the welded pipeline through the hole. A diagram of a typical HDD process is presented in Appendix B.

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Jurisdictional Waters and Wetlands
JP-8 Fuel Pipeline and Terminal at Travis AFB

FIGURE 3

The HDD entry point would be located along the eastern edge of the Ecological Preserve that encompasses the Aero Club (Figure 2). The entry point would require a disturbance area of approximately 200 feet by 150 feet (0.69 acre) for equipment and material storage. The HDD would be pushed to the west approximately 5,350 feet to the exit point near Walters Road (Figure 2). The exit point would require a disturbance area of approximately 120 feet by 75 feet (0.21 acre) centered on the existing railway line. Entry and exit points would be restored to pre-construction condition upon completion of the project.

Heavy walled pipe would be inserted into the hole at the HDD entry point and pulled the 5,350 feet to the west. Pipe would be strung and welded in sections along the railway line east of the HDD entry point prior to being pulled into the hole.

Drilling mud (primarily bentonite slurry) would be used under pressure to allow for subsurface drilling and to maintain the structure of the hole during the operation. Drilling mud would be recycled during the operation, collected upon completion of drilling operations, and hauled off for disposal. Drilled solids would be collected and hauled off as well.

Using drilling mud under pressure has the potential to create a surface fracture (frac-out) where drilling mud finds its way to the surface through cracks or weak points in the soil. To minimize the chance of frac-out, bore path design would incorporate maximum entry and exit angles as well as depth (approximately 50 feet), drilling mud pressures would be monitored, and frac-out contingencies would be instituted to deal with containment and clean-up operations. A Frac-Out Contingency Plan would be prepared detailing action that would occur in the event of a frac-out, including:

- Temporarily halting drilling operations when frac-out is identified.
- Onsite staging of containment equipment for quick response to frac-out, including vacuum trucks, spill containment booms, half drums, absorbent pads, culvert pipes, sand bags, and hand tools.
- Once the frac-out has been contained, a determination would be made as to potential for impact to sensitive species or habitats. If there was potential for impact, the appropriate regulatory agencies would be contacted to coordinate additional impact assessment and potential mitigation.
- Measures would be instituted to reduce the threat of further frac-out, and drilling would begin again.

2.1.2.2 Conventional Trenching

The conventional method of pipeline installation involves trench excavation and pipeline placement using backhoes, graders, excavators, and side boom tractors as well as potentially a trenching machine. Conventional trenching would be used to place the 16-inch pipeline underground approximately 150 feet from the western edge of the HDD bore exit point to the Travis Junction, and approximately 1,720 feet from the eastern edge of the HDD bore entry point to the Travis Terminal (Figure 2). Temporary disturbance

would be restricted to 75 feet in width for the entire 1,870 feet (3.22 acres) of 16-inch pipeline construction.

Conventional trenching would also be used to place the 10-inch pipeline approximately 2,300 feet from the proposed Travis Terminal to the existing terminal east of Union Creek (Figure 2). The pipeline would be placed along the south edge of Hangar Avenue, and temporary disturbance would be restricted to 50 feet in width in areas that are not currently paved (a total of approximately 860 feet [0.99 acre]) and 75 feet in width (2.48 acres) in existing paved areas (primarily east of Union Creek). A slick bore may be used to place the 10-inch pipeline beneath Union Creek as described in Section 2.1.2.3, or the pipe would be attached to the bridge abutment spanning the creek.

A cross-section of the proposed conventional trenching method is shown in Appendix B. Typically, a 6-foot-deep, 3-foot-wide trench would be excavated. Topsoil would be salvaged and stored separately. Subsoil would be stockpiled adjacent to the trench.

The pipeline would be installed in a continuous fashion from one end of the project site to the other. The pipe would be set next to the trench using a hydrocrane and welded into a continuous section. The pipe section would then be lowered into the trench, tied into the adjacent section, and backfilled.

Backfill material would be obtained from the ditch spoils. As needed, spoils would be screened as the material is returned to the ditch, using standard construction screening equipment. The pipe would be covered along the sides with a maximum of 6 inches of native fill free of rocks, and then covered on top with a minimum of 12 inches of fill free of rocks. The backfill in the remainder of the trench would be native material excavated during trenching. The excavated trench would be compacted to construction specifications relative to adjacent soils (per SFPP pipeline construction specifications), and topsoil returned. The disturbance area would be restored to pre-construction contour and natural surface drainage, accounting for trench settling, and revegetated with native species.

2.1.2.3 Slick Bore

The 10-inch pipeline may be placed under Union Creek using a construction method called slick bore. Slick bore uses a series of augers to carry cut materials through a bored hole where a sacrificial pipe is installed to stabilize the hole. The sacrificial pipe is the same size as the final carrier pipe, which is pushed in behind the sacrificial pipe until the final carrier pipe is in place. Typically, no drilling fluids are used during this process. The advantage to utilizing a slick bore over a conventional jack and bore (in which a larger size pipe is installed as a casing) is that the carrier pipe can be cathodically protected when the slick bore is used. Cathodic protection is important in the prevention of corrosion along the pipeline.

Staging areas would be set up in the excavated trench (constructed during conventional trenching operations) on either side of Union Creek. Boring equipment would be lowered into the trench to complete the operation. Cut materials from the bore hole would be removed and stored in the adjacent area with excavated trench material, or hauled off

site. The pipe would be installed at least 60 inches below grade and connected to the pipe constructed using conventional trenching methods.

2.1.3 Travis Junction

The Travis Junction would provide the tie-in point for the 16-inch Travis Pipeline with the existing SFPP 20-inch pipeline running north/south along Walters Road, and includes a permanent above-ground pipeline control and maintenance facility (Appendix C). The Travis Junction would be confined to the existing railway right-of-way and require disturbance of an approximately 0.28-acre area where the 20-inch pipeline would be looped through using conventional trenching techniques, and tied into the 16-inch Travis Pipeline. The fenced pipeline control and maintenance facility at the Travis Junction would be constructed within the existing railway right-of-way in an approximately 0.17-acre area, and would contain:

- an above-grade 20-inch valve;
- three 16-inch valves;
- associated piping and pig launching facilities (utilized to launch cleaning and inspection tools through the pipeline);
- product sampling and control systems; and
- a small parking area for maintenance personnel.

The Travis Junction would permanently disturb 0.017 acre of the drainage ditch along the south side of the railway line. Drainage through the area would be maintained by installing a new culvert under the railway tracks in which flow would be diverted to the northern railway ditch and allowed to continue to the west into the roadside ditch at Walters Road. Remaining temporary impacts would be restored to pre-construction condition upon project completion.

2.1.4 Equipment Requirements

Equipment requirements for excavating and grading the Travis Terminal include: two backhoes/excavators, six dump trucks, two graders, two scrapers, one D8 bulldozer, two front-end loaders, two Bobcats, and one water truck. Construction of tanks would require one 75-ton hydraulic crane, three 15-ton hydraulic cranes, nine welding rigs, and vehicles for support and inspection crews.

Pipeline construction would require one backhoe/excavator, one front-end loader, two to six dump trucks, one drill rig for slick bore and HDD, three side booms, four welding rigs, one water truck, and vehicles for pipeline crews and inspectors.

2.1.5 Access and Staging

Equipment access would come from existing roadways within Travis AFB, the existing railway bed, and from Walters Road.

Equipment and material staging would be confined to the Travis Terminal construction area; a temporary staging area (1.30 acres) located along the northern edge of the proposed Travis Terminal; a temporary staging area (0.60 acre) located west of Walters Road within Travis AFB property; and within the temporary disturbance areas proposed for pipeline construction using conventional trenching, HDD, and slick bore. Temporary disturbance areas would be restored to pre-construction condition upon project completion.

All vehicles and equipment will be restricted to the staging areas, construction areas, and to the existing railway bed west to Walters Road.

2.1.6 Hydrostatic Testing

The tanks and pipeline constructed during this project would be hydrostatically tested prior to operation by filling with clean water, pressurizing the pipeline to a minimum of 1,850 pounds per square inch, and holding it for 8 hours. Once the tests are complete the water would be tested for standard water quality parameters and released into the existing Travis AFB stormwater system under controlled pressure and using standard best management practices (BMPs) to avoid effects of erosion. Because the project is using clean steel for construction and clean water for hydrostatic testing, water quality impacts are not anticipated.

2.1.7 Utility Infrastructure

Electrical systems for the Travis Terminal would be constructed underground, adjacent to the 10-inch pipeline that would connect to the existing terminal to the east. Electricity would be supplied to the Travis Terminal to run pumping equipment, lighting, communications systems, and fire protection equipment. Therefore, no additional disturbance is associated with construction of utility structures for the Travis Terminal.

An existing overhead power line bisects the proposed Travis Terminal from north to south. That line would be re-directed underground beneath the Travis Terminal using conventional trenching methods within the terminal disturbance area. Therefore, no additional disturbance is associated with undergrounding of the overhead line.

At the Travis Junction facility, utility lines would be diverted off of existing Pacific Gas & Electric (PG&E) power lines adjacent to Walters Road. This would involve the construction of potentially two additional power poles along the northern edge of the Travis Junction control and maintenance facility. The pole locations would be included in the temporary disturbance area required along the north side of the railway for connection to the 20-inch pipeline. The electrical poles would be the only above-ground structures on the north side of the existing railway; however, resulting permanent impact from pole placement would be minimal.

2.2 Project Schedule

Construction operations, including Travis Terminal and Pipeline segments, are scheduled to begin in the 3rd quarter of 2009, based on final project approval. Construction of the

Travis Terminal is estimated to take approximately 18 to 22 months. Construction of the Travis Pipeline and Travis Junction is estimated to take 3 to 4 months and will be restricted to the dry season (April 16 to October 14).

2.3 Operations

2.3.1 Operation

The Travis Terminal, Travis Pipeline, and Travis Junction would be unmanned facilities operated by a computerized system of pipeline communications and system control referred to as the Supervisory Control and Data Acquisition (SCADA) system. The computerized SCADA system continuously gathers operational data from critical sources throughout the system and automatically adjusts the pressure and flow rate of the pipeline to provide for safe operation of the system. Pumps are equipped with various safety devices, such as pressure sensing devices and electrical current and temperature measuring devices, to assure reliable and safe operation. The pipeline is protected by pressure control valves as well as pressure measuring devices.

The leak detection system for the Travis Terminal is based on computerized surveillance by detection equipment placed within the tank secondary containment. This secondary containment is constructed of high-density polyethlene with 80 millimeter thickness and welded to the inside of the tank ring-wall foundation. Additional containment is provided by placing the tanks within a diked or bermed area. This containment is sized in accordance with code requirements and will contain 100 percent volume of 1 tank plus precipitation from a 25-year storm.

Leak detection for the Travis Pipeline is based on computerized surveillance of volumetric line balance, flow deviation and pressure deviation. All shipping pumps are equipped with maximum and minimum shut-down devices. These devices would automatically shut down the pipeline in case of a pressure anomaly. The line balance system is designed to detect and alarm leaks.

The buried pipelines and tank bottoms would be protected from corrosion by cathodic protection (CP), which involves the placement of anode beds at regular intervals along the line to produce an electrical current in the pipe itself that counters the act of iron oxidation. Inspections of the CP system are performed annually by measuring electrical potentials along the pipeline via above-ground test stations.

2.3.2 Maintenance

Terminal and pipeline facilities require regular inspection and maintenance to keep the system in operation. These activities are required by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) (49 CFR Part 195) regulations and include, but are not restricted to, the following:

- Regular inspection of the terminal and pipeline route to inspect for visible leaks and to evaluate above-ground equipment including valve stations, pump and power stations;

- Excavation and repair of pipeline segments experiencing coating degradation or requiring inspection to evaluate coating condition;
- Repair of valve stations and anode beds where damage is noted during regular inspection;
- Placement of additional anode beds in order to reduce pipe corrosion rates;
- Repair of pipeline anomalies identified during internal inspection or at locations damaged by third parties.

Any repairs of block valves or other aboveground equipment would occur in the Travis Terminal or Travis Junction areas, and therefore would not require additional disturbance to undisturbed areas.

PHMSA requires internal inspections of pipelines every 5 years to check for deformation, metal loss, and other anomalies in the wall of the pipe. “Smart pigs” are devices used to inspect and record the pipeline condition by detecting where corrosion or other damage has affected the wall thickness or shape of the pipe. If the smart pig detects an anomaly in the pipeline, crews would be deployed to the site to excavate, evaluate the pipe, and repair the section if necessary. Pipeline excavation and repair would only occur along areas that were constructed using conventional trenching or potentially slick bore methods. Pipeline constructed using HDD would most likely be too deep to access from the surface and, therefore, internal inspection would be conducted without the ability to expose the pipe for visual inspection. The use of heavy walled pipe used in the HDD process, in combination with cathodic protection supplied to the entire pipeline, reduces the likelihood that maintenance would be required along the section that was placed using HDD. Therefore, in all cases, the area proposed for disturbance for pipeline maintenance would occur in previously disturbed areas that were constructed using trenching methods. Should the implementation of conservation measures applied during construction, as described in Section 2.4, not alleviate potential impact to listed species, the maintenance project would undergo separate Section 7 consultation with USFWS and involve separate mitigation for unavoidable impacts.

2.3.3 Emergency Actions

On January 20, 2009 the California Environmental Protection Agency published guidance on program implementation and compliance with the California Aboveground Petroleum Storage Act (APSA). This guidance confirms petroleum storage facilities regulated by the Department of Transportation (DOT) (i.e., breakout facilities for interstate pipelines with no transfer into truck or rail cars) are excluded from APSA and Spill Prevention Control and Countermeasure (SPCC) regulation. Travis AFB operations will be included in SFPP’s Integrated Contingency Plan (ICP) for the area, which will address actions to be taken during an emergency. The ICP is intended to guide emergency response activities throughout the SFPP – Pacific Operations and to comply with all state and federal regulations. The pipeline and terminal operations at Travis AFB will be addressed in the Northern Region – California Nevada /Sacramento Area Section of the ICP and integrated into the plan within 30 days of operation (per DOT and PHMSA regulation). The purpose

of the ICP is to establish a predetermined mode of operation for response to any incident that could adversely impact the safe operation of facilities, including internal and external notification procedures, initial response action, description of availability of resources, and reference to facility-specific emergency response information.

In the event of a fire or other emergency during normal operations of the facility, response will be coordinated through Travis AFB emergency responders. Access would come from existing maintenance roads surrounding the Travis Terminal facility, existing maintenance roads along the Travis Pipeline, and from Walters Road at the Travis Junction.

2.4 Conservation Measures

Conservation measures are included as part of the Proposed Action, and are designed to avoid and minimize adverse effects to listed species. Conservation measures are listed below and are discussed in more detail in Subsection 5.4:

- Implementation of a program to protect sensitive habitats and species including training, establishment of visible construction area limits, monitoring, and reporting.
- Avoidance of surface disturbance in environmentally sensitive areas by use of HDD and slick bore or bridge attachment as described in Section 2.1.2.
- Implementation of timing schedules for pipeline construction to be conducted during the dry season only (April 16 through October 14).
- All temporary disturbance areas would be returned to pre-construction conditions within 1 year of disturbance.
- Implementation of a Stormwater Pollution Prevention Plan to control stormwater during construction.
- Implementation of a Dust Control Plan to include clean water application in disturbed areas, covering soil stockpiles, and maintaining good housekeeping practices.
- Implementation of a SPCC Plan during construction of the facilities.
- Implementation of a Dewatering Plan to control sedimentation caused by dewatering of trench area and other excavations (if dewatering is required).
- Implementation of a Revegetation and Weed Control Plan for restoration of temporarily disturbed areas. The Plan would include hydroseeding with native plant species approved by Travis AFB environmental staff, and weed control provisions to ensure successful establishment of native species.
- Implementation of a Frac-Out Contingency Plan to effectively contain and clean up frac-out material, should it occur. The Plan would include impact assessment and reporting requirements based on that assessment.

3.0 DESCRIPTION OF THE ACTION AREA

This BA addresses possible effects of the Proposed Action in all areas subject to the direct effects associated with construction and operation of the Travis Terminal, Travis Pipeline, and Travis Junction, including temporary and permanent disturbances as well as the indirect effects associated with hydrological modifications. Noise effects of construction and facility operations are not expected to affect listed species discussed in Section 4; therefore this BA does not include the effects of noise.

The following sections provide a regional and site-specific description of habitat in the vicinity of the Proposed Action.

3.1 Regional

Travis AFB is located in the northeastern portion of the Fairfield-Suisun Hydrologic Basin (CH2MHill 2009). Within the basin, water generally flows south to southeast toward Suisun Marsh, a 116,000-acre tidal marsh that is the largest contiguous estuarine wetland in the continental United States. Suisun Marsh drains into Grizzly Bay, Suisun Bay, the Carquinez Straits, San Pablo Bay, San Francisco Bay, and ultimately discharges into the Pacific Ocean near the City of San Francisco.

Union Creek is the primary surface water pathway for runoff at Travis AFB. The headwaters of Union Creek are located approximately 1 mile north of Travis AFB, near the Vaca Mountains. Union Creek splits into western and eastern branches north of Travis AFB and discharges into Hill Slough, a wetland located 1.6 miles from the Travis AFB boundary. Surface water from Hill Slough flows into Suisun Marsh.

Travis AFB occupies a remnant portion of the Solano-Colusa Vernal Pool Region (Keeler-Wolf 1998), characterized by periodic alkaline basins surrounded by upland herbaceous-dominant vegetation of the Sacramento Valley (USFWS 2005). The vernal pools at Travis AFB are included in the Northern Claypan Vernal Pool Series (Sawyer and Keeler-Wolf 1995).

Much of the habitat containing vernal pools in the region has been converted to agriculture or developed as residential, commercial, or industrial developments. Less-intensely altered agricultural lands (including old rice fields) are targets for restoration including land acquisitions through direct purchases, conservation easements, or other cooperative agreements (USFWS 2005). Areas intended for preservation of claypan vernal pools and sensitive species have been established by private and public entities in the project vicinity, primarily to the east of Travis AFB. These preserves include the Wilcox Ranch, Muzzy Ranch, Jepson Prairie Preserve, and the Calhoun Cut Ecological Area.

Travis AFB has established five Ecological Preserve Areas on the base, three of which were a requirement of a Biological Opinion issued by the USFWS, dated 28 May 1999 (Travis AFB 2003). Travis AFB established regulations designating these areas special ecological preserves in perpetuity, for the purpose of conserving regional vernal pool

ecosystems and their unique species, and restricting entry and uses to those not conflicting with that purpose (Travis AFB 2003).

The Travis AFB property boundary extends west of the main property along a 75-foot-wide railway right-of-way to the point where it meets with the active Union Pacific Railroad line west of Walters Road (Figure 2). USFWS is coordinating development of preservation areas on private land north and south of the existing railway, focusing on preservation of the endangered Contra Costa goldfields (*Lasthenia congujens*) (Tovar pers. com. 2008).

3.2 Site Specific

The proposed project would occur in the western portion of Travis AFB. Land use activities have significantly affected the structure and composition of natural resources on Travis AFB. Much of the base is developed and contains impervious surfaces (e.g., runways, roads, buildings), as well as lawns and landscaped areas. The remaining undeveloped areas are actively maintained (i.e., mowed, disced, grazed, or a combination of these) to limit vegetation growth, thereby limiting potential for bird strike hazards to aircraft.

ERP Site LF044, in which the Travis Terminal would be located, is an approximately 25-acre area used for equipment training and stockpiling of construction debris (Figure 2). Existing and historical uses of ERP Site LF044 have resulted in existing surface disturbances, including concrete rubble and asphalt at the ground surface. The site may be a source of potential human health and ecological risk due to soil contamination from constituents of construction debris (Travis AFB 2002). ERP Site LF044 was established by Travis AFB in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 USC § 9601 *et seq*. (Travis AFB 2002).

The *Soil Record of Decision (ROD) for the West/Annexes/Basewide Operable Unit (WABOU)* is a legal document that describes the selected remedies for ERP sites on Travis AFB (Travis AFB 2002). The WABOU Soil ROD requires Travis AFB to install a fence around ERP Site LF044, create periodic disturbance to limit wildlife habitat, and build protective berms to prevent the transport of soil contamination via surface water flow during rain events into nearby vernal pools. Travis AFB completed the installation of the fence and berm at ERP Site LF044 in 2003 and began use of the area for heavy equipment training in 2006 (Travis AFB 2002).

Two Ecological Preserve Areas occur within or adjacent to the proposed project: one north of the proposed Travis Terminal and a second that encompasses the Aero Club at the western boundary of Travis AFB (Figure 2). The 10-inch pipeline would travel through the northern portion of the Ecological Preserve along Hangar Avenue, and the 16-inch pipeline would be installed using HDD beneath the Ecological Preserve encompassing the Aero Club.

The decommissioned railway contains ballast material, ties, and the rail line, but has been out of service for several decades. Areas north and south of the Travis AFB railway property include an auto salvage yard to the north, grazing lands to the north and south, and residential and commercial areas further to the south.

3.2.1 Hydrology

Surface water hydrology has been significantly altered in the Action Area through Travis AFB operations including historical and ongoing activities at ERP Site LF044 (including construction of the berm to divert surface contaminants away from vernal pools), and the construction of the decommissioned railway line to supply the base. The western branch of Union Creek, which flows along the eastern edge of the Travis Terminal location, has been channelized for stormwater drainage for the majority of its route across Travis AFB. Union Creek provides catchment for surface flows in the Travis Terminal area and areas to the east.

Appendix D contains a Hydrological Assessment prepared for the Travis Terminal portion of the Proposed Action, and is intended to assess how rainfall runoff patterns change due to the addition of impervious cover resulting from the Proposed Action. Due to the existing clay soils, addition of impervious cover would not significantly alter surface hydrology in the Travis Terminal area. Construction of the Travis Pipeline would create temporary impacts only, and with proper restoration, would not significantly alter hydrology within the project area. Construction of the Travis Junction would include installation of a culvert to divert flow in the southern railway ditch into the northern railway ditch, where it would then flow to the roadside ditch along Walters Road.

Appendix E contains a Preliminary Jurisdictional Determination and Delineation of Waters of the U.S. conducted for the Proposed Action. Figure 3 was produced based on waters identified in the project area as described in Appendix E, and includes general surface water hydrology trends based on topographic data in the Proposed Action area. Surface water flows west of the Travis Terminal location trend to the southwest along the railway line. North-to-south flows are interrupted by the drainage ditches along the north and south sides of the railway line. Water in the railway ditches flows into the swale that borders the auto salvage yard, where it is carried south to Hill Slough or to the roadside ditch along Walters Road, where it is carried to Belmont Creek west of the project area through residential storm drains.

Vernal pool hydrology in the Northern claypan vernal pools in the project area is determined primarily by timing and amount of rainfall during a season, along with basin topography. The water restrictive layer in these vernal pools is formed by a surface clay layer rather than a duripan type subsurface structure (Williamson et al. 2005). Vernal pool hydrology is controlled primarily by surface water runoff (Marty pers. com. 2008; McCarten pers. com. 2008; Williamson et al. 2005). Natural surface water flows in most years are limited to instances when pools are at capacity and overland sheet flow exceeds the water holding capacity of individual pools (Hanes and Stromberg 1998 from Department of the Air Force 2007). Subsurface flows have limited importance in maintaining hydroperiods in vernal pools associated with the Action Area; however, subsurface flows may dampen

water level fluctuations during the wet season (Hanes and Stromberg 1998 from Department of the Air Force 2007).

3.2.2 Soil Types

Travis AFB is located on a nearly level to gently rolling terrace where the soils formed in alluvium are derived from sedimentary material (USDA 1977). The primary soil type found in the project area is the Antioch-San Ysidro complex (0 to 2 percent slope; AoA) (USDA 1977 and 2008a) (Figure 4). Travis Terminal construction occurs on AoA soils and Altamont-San Ysidro-San Benito complex soils (2 to 9 percent slope; AIC). Pipeline construction passes through primarily AoA soils but also through a segment of San Ysidro sandy loam (0 to 2 percent slope; SeA), and small inclusions of Omni clay loam (Om) and Pescadero clay loam (Pc). AoA, Om, and Pc soils are found on the list of hydric soils of California (USDA 2008b).

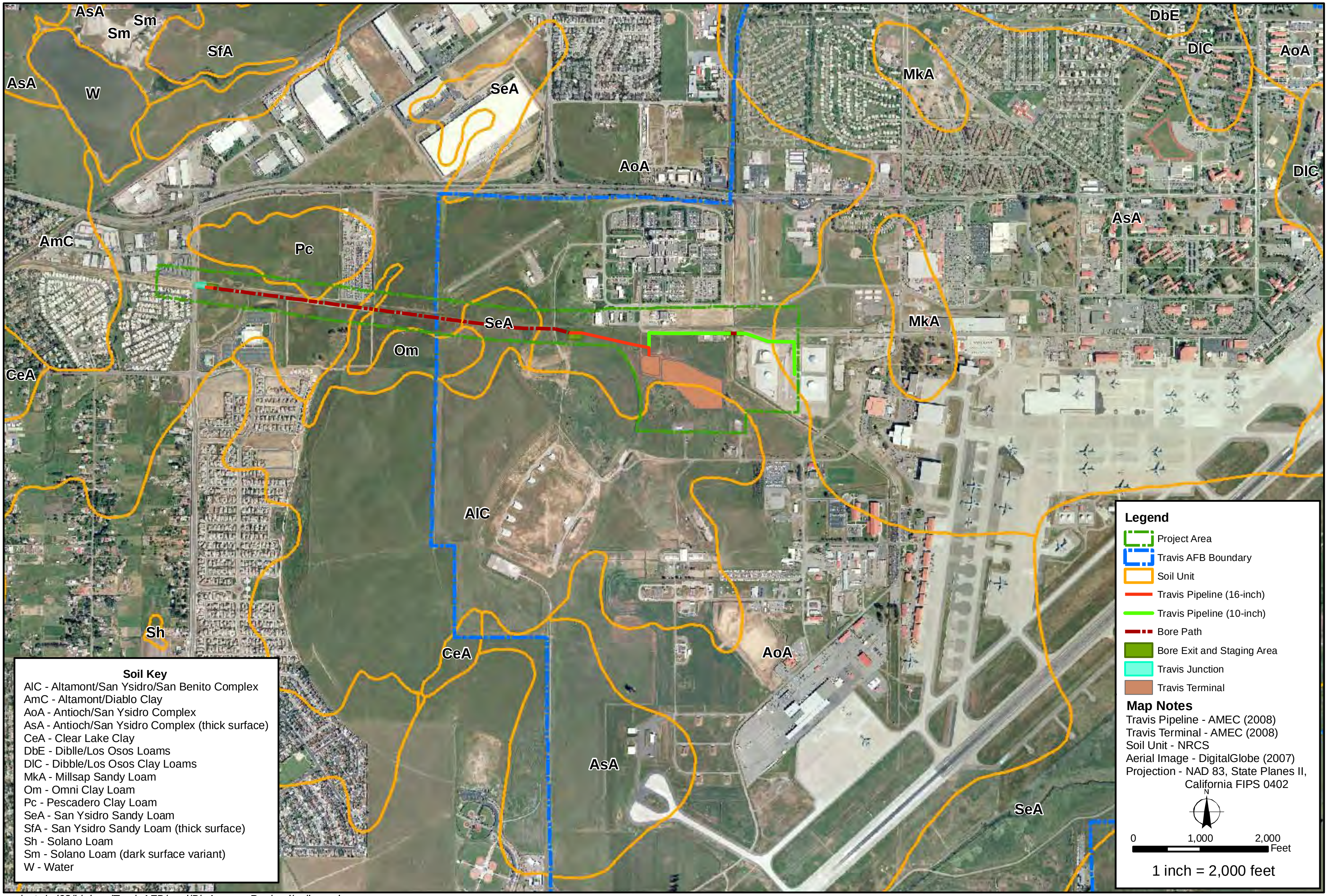
3.2.3 Vegetation Types

The western portion of Travis AFB contains a mixture of developed areas, grasslands, and vernal pool complexes. Historically, the soils in the project area likely supported extensive Northern claypan vernal pools. Alterations to surface hydrology related to development and base operations have led to degradation of these complexes. Native vegetation communities have been altered by the introduction of non-native grasses for grazing purposes and current land management activities, including discing and mowing to limit vegetation growth and potential for bird strike hazards, as described in the Travis AFB Bird/Wildlife Aircraft Strike Hazard (BASH) Plan (Travis AFB 2006).

Vegetation communities were categorized by AMEC (2009) in the document in Appendix E. The National List of Plant Species that Occur in Wetlands (Reed 1988) was used to determine the wetland indicator status of the plants per federal requirements. Plant species were classified as obligate wetland (OBL) with greater than 99 percent probability of occurring in wetlands; facultative wetland (FACW) with 67 to 99 percent probability of occurring in wetlands; facultative (FAC) with 33 to 67 percent probability of occurring in wetlands; facultative upland (FACU) with 1 to 33 percent probability of occurring in wetlands; or upland (UPL) with less than 1 percent probability of occurring in wetlands. Generally, the project area can be divided into the following six vegetation community types:

- **Riparian**

  This community type is restricted entirely to the constructed channel of the west branch of Union Creek. The steep banks and bed of the channel are dominated by small willows (*Salix* sp.) (primarily FACW to OBL) and cattail (*Typha* sp.) (OBL).



projectg/sd08/biology/TravisAFB/mxd/BioAssess_Revised/soils.mxd

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Soil Survey
JP-8 Pipeline and Terminal at Travis AFB

FIGURE 4

- **Developed and Disturbed**

  This community type is found in developed areas, along roadways, within portions of ERP Site LF044 where concrete and asphalt rubble lie at the surface, and along the existing railway line where ballast, ties, and track create a 2- to 4-foot topographical elevation change from the surrounding land. These areas are mostly unvegetated; however, sparse vegetation exists in areas and includes spring vetch (*Vicia sativa*) (UPL), and ripgut brome (*Bromus diandrus*) (UPL).

- **Eucalyptus Woodland**

  A small pocket of mature bluegum eucalyptus (*Eucalyptus globulus*) (UPL) occurs at the eastern edge of the proposed Travis Terminal location.

- **Upland Annual Grassland**

  This community type occurs in upland vegetated areas and is dominated by introduced annual grasses associated with grazing, along with occurrences of non-native and native forbs, and small shrubs. Dominant species in this community include ripgut brome, rat-tail fescue (*Vulpia myuros*) (FACU), wild oat (*Avena fatua*) (UPL or FACU), filaree (*Erodium botrys*) (UPL), and sparse coyote brush (*Baccharis pilularis*) (UPL).

- **Non-Native Grass Seasonal Swales**

  This community type is found in shallow depressional areas primarily along the drainage ditches that follow along the north and south side of the railway line. These ditches were constructed during installation of the railway and are designed to carry flows primarily to the west. They hold water for short periods of time relative to active vernal pools, and are dominated by foxtail barley (*Hordeum jubatum*) (FAC), perennial ryegrass (*Lolium perenne*) (FAC), ripgut brome, filaree, and wild oat. The overall habitat quality and species diversity are generally low in these areas relative to true vernal pool habitats.

- **Vernal Pools and Swales**

  This community type is found in extant and remnant vernal pools within and adjacent to the project area, and is dominated by native annual plants characteristic of Northern claypan vernal pools (Sawyer and Keeler-Wolf 1995). These areas typically occur where the basin topography is pronounced and surface water is allowed to pool for extended periods of time. Several pools and swales were sparsely vegetated and covered with a filamentous algae crust. However, dominant vegetation in most pools included coyote thistle (*Eryngium vaseyi*) (FACW), popcorn flower (*Plagiobothrys stipitatus* var. *micranthus*) (OBL), semaphore grass (*Pleuropogon californicus*) (OBL), horned downingia (*Downingia ornatissima*) (OBL), common spikerush (*Eleocharis macrostachya*) (OBL), woolly marbles (*Psilocarphus brevissimus*) (OBL), smooth goldfields (*Lasthenia glaberrima*) (OBL), and Contra Costa goldfields (FACW).

3.2.4 Wetlands and Other Jurisdictional Waters

As discussed in the preliminary jurisdictional determination and delineation in Appendix E, the Proposed Action area contains wetlands and other waters that would most likely be considered jurisdictional waters of the U.S. under Section 404 of the Clean Water Act (CWA). The wetland delineation was performed within an area comprised of the proposed Travis Terminal and Travis Pipeline (including 10-inch and 16-inch lines and the Travis Take-Off area) and was extended to include an additional 250 feet to the north and south of the proposed project boundary. The study identified 11.17 acres of wetland and 1.18 acres of non-wetland (railway drainage ditch) waters of the U.S. in the study area.

Jurisdictional waters in the proposed Travis Terminal area include the west branch of Union Creek and vernal pools and swales that have a surface water connection to Union Creek (Figure 3). Vernal pools and swales north and south of the railway line and the railway drainage ditches themselves would most likely be considered jurisdictional waters through a surface water connection to the unnamed slough that flows south, adjacent to the auto salvage yard or the roadside ditch along Walters Road (Figure 3). Union Creek, the unnamed slough, and the roadside ditch at Walters Road eventually flow into the Suisun Marsh southwest of Travis AFB. The Suisun Marsh includes tidal wetlands adjacent to the Suisun Slough, which is a traditional navigable waterway.

4.0 STATUS OF SPECIES IN THE ACTION AREA

4.1 Technical Support Studies Relevant to the Proposed Action

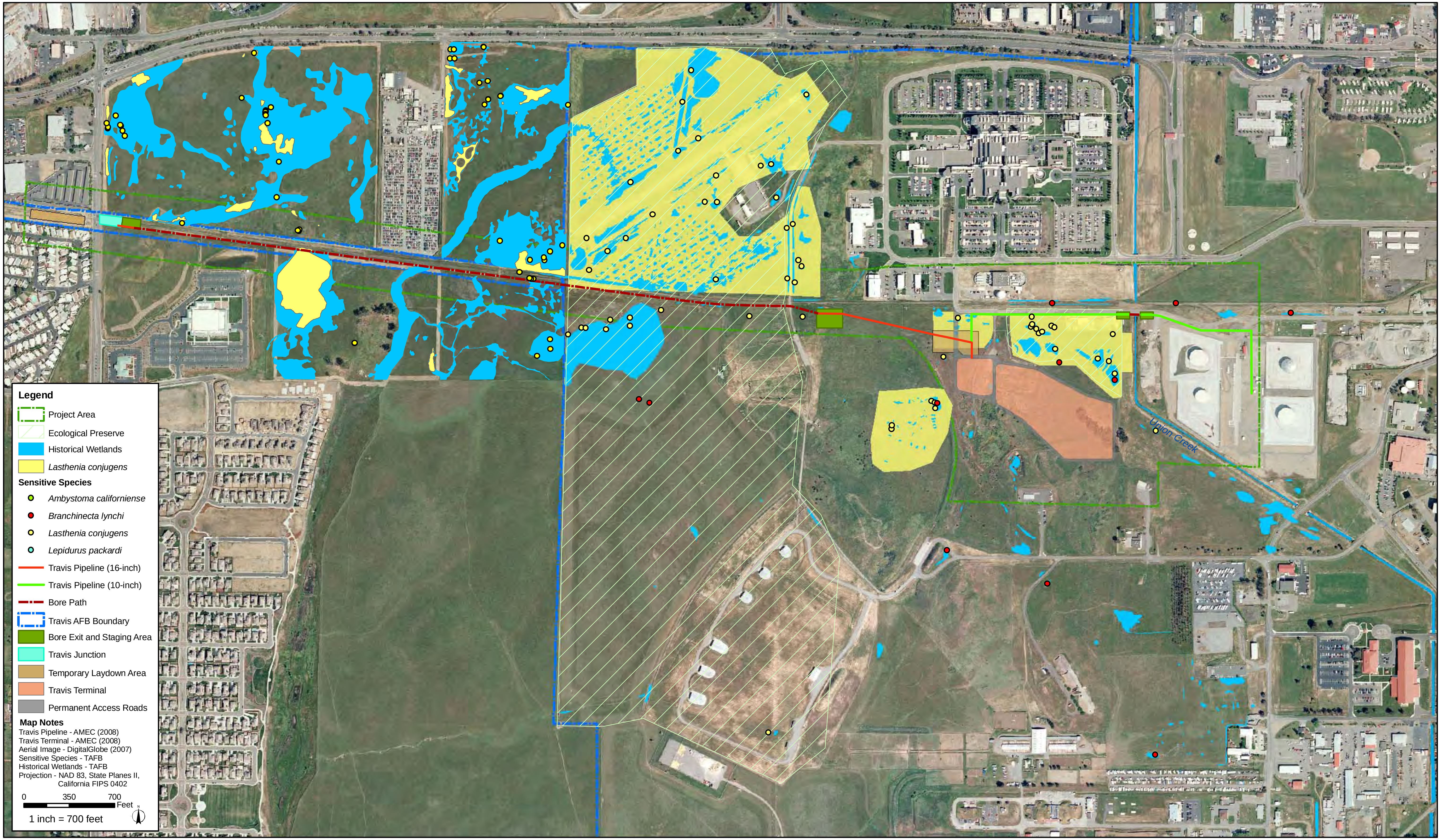
Literature review, California Natural Diversity Data Base (CNDDB) queries, technical support studies for the Proposed Action, and technical support studies for other actions in and surrounding Travis AFB were used to identify potential species and species habitat that may be present within the Proposed Action area.

Technical studies performed at Travis AFB related to biological resources have included base-wide and project-specific surveys for wetlands and sensitive species. These studies are listed in Table 2. Geographic Information System (GIS) data collected during these technical studies (and additional studies not listed) was made available by Travis AFB. Technical studies conducted on adjacent properties to the west include wetland delineations and Contra Costa goldfields populations (Tovar pers. com. 2009). Figure 5 provides a representation of data based on historical information collected at Travis AFB and on adjacent properties to the west.

Technical studies conducted for the Proposed Action are listed in Table 3. Figure 6 provides a representation of the data collected onsite during the preliminary delineation (AMEC 2009) (Appendix E), and includes identification of vernal pools containing Contra Costa goldfields based on the delineation and Rare Plant Survey (Restoration Resources 2008) (Appendix F). Discrepancies shown in wetland delineation data from historical surveys (Figure 5) and the survey conducted for this project (Figure 6) are likely related to changes in topography or hydrologic regime resulting from natural processes or from base operations such as soil disturbance at ERP Site LF044. Figure 7 shows known distributions of vernal pool crustaceans in the vicinity of the Proposed Action area based on information provided by Garcia and Associates (2008a) (Appendix G). Figure 8 shows known distributions of California tiger salamander within the vicinity of the Proposed Action area based on information provided by Garcia and Associates (2008b) (Appendix H).

4.2 Species Considered for Analysis

A species list was obtained from the USFWS Sacramento Ecological Services Field Office via an online query system indexed to U.S. Geological Survey (USGS) quadrangles. This list functions as the “official” species list issued by the ecological services office pursuant to 50 CFR 402.12(e). Four USGS Quadrangle names (Elmira, Denverton, Birds Landing, and Dozier) that covered the Action Area, as well as Travis AFB and surrounding areas, were submitted. Table 4 includes descriptions of those species found in the USFWS official list for the area. Habitat requirements were derived from available literature, and potential for occurrence in the Action Area was determined based on available information from sources listed in Table 2.



Projects/08/Biology/TravisAFB/mxd/BioAssess_Revised/mxd/sspecies.mxd

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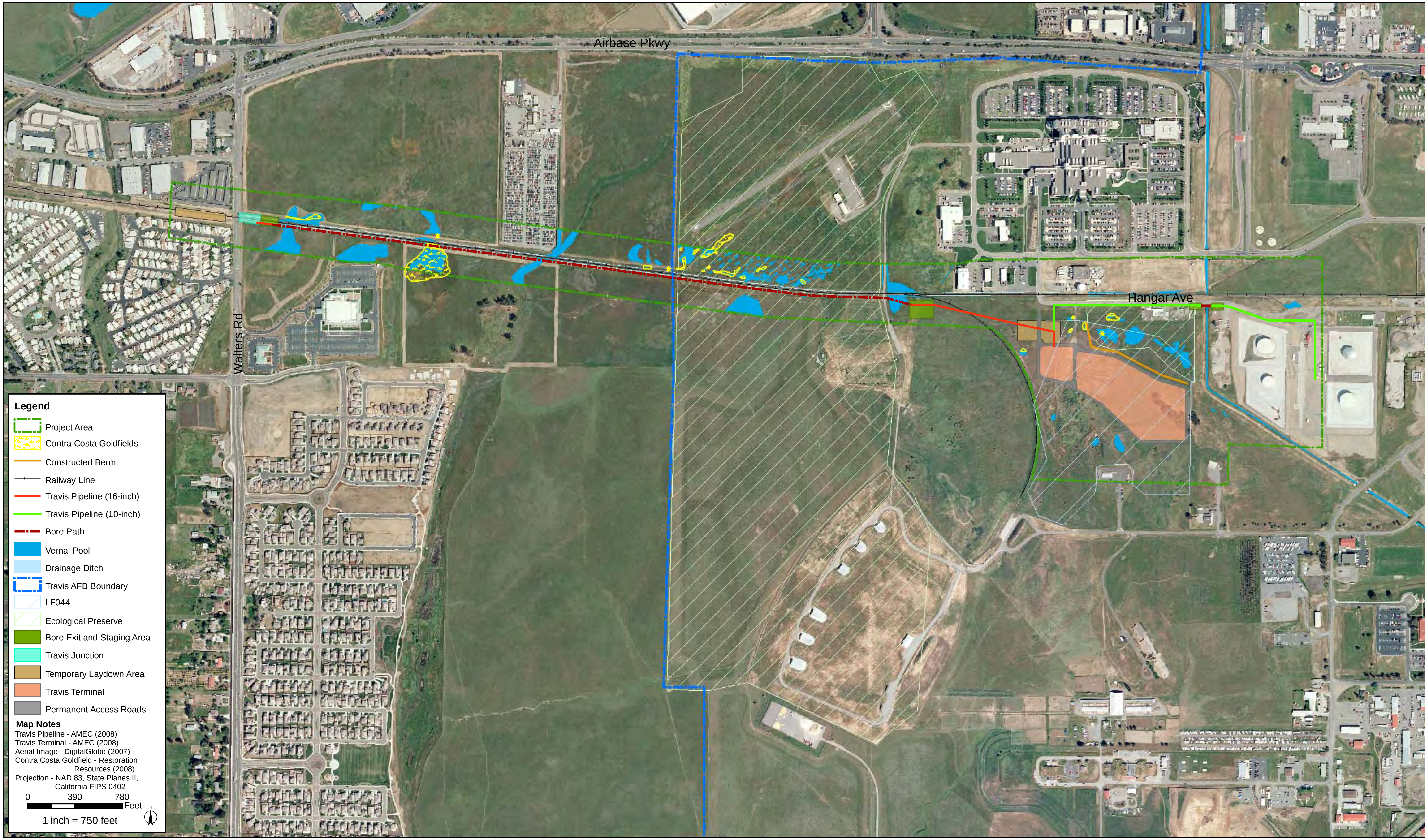
Historical Biological Resource Data from Travis Air Force Base and Adjacent Properties
JP-8 Pipeline and Terminal at Travis AFB

FIGURE
5



ProjectG/Biology/08/TravisAFB/mxd/BioAssess_Revised/goldfields.mxd

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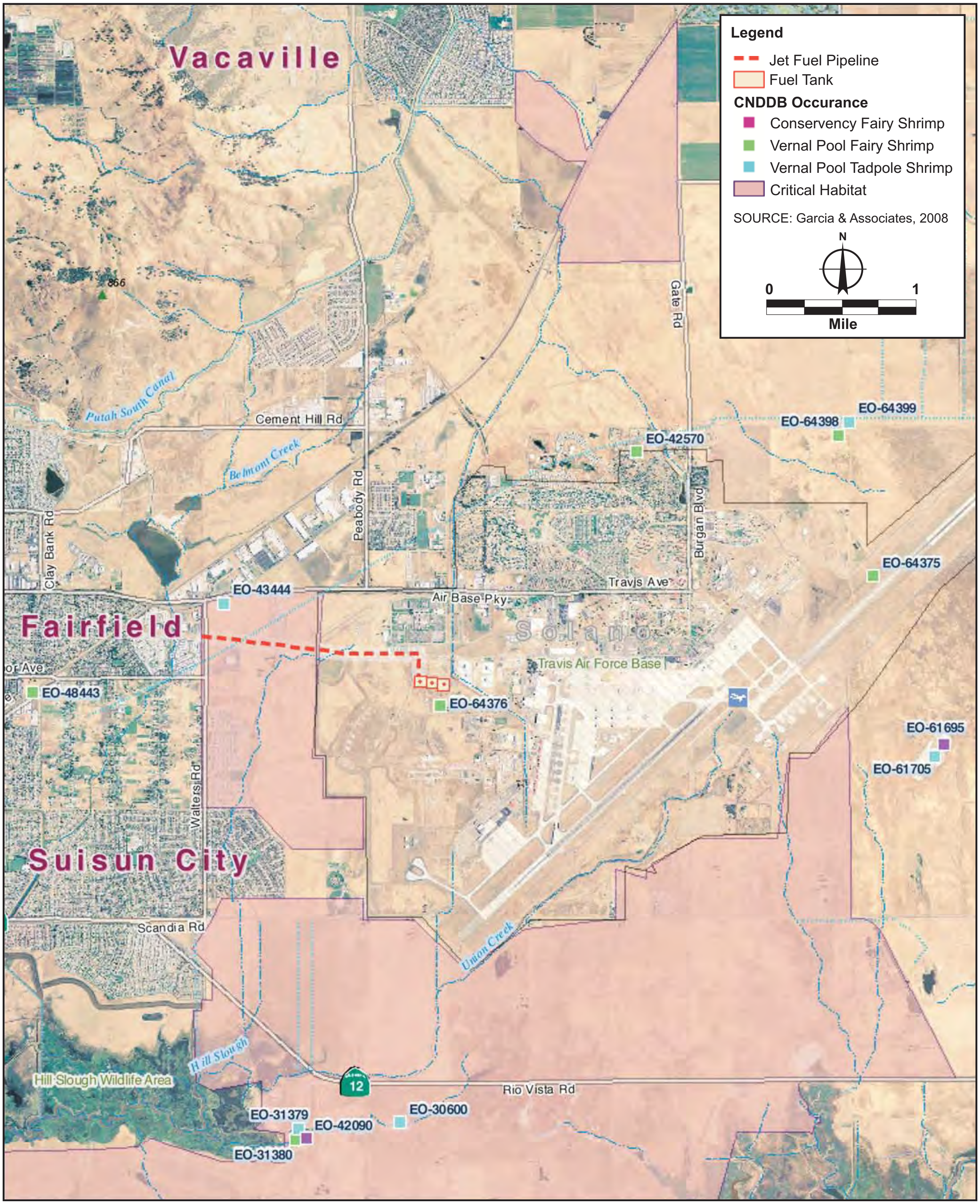
Wetlands and Contra Costa Goldfield Populations Based on 2008 Survey
JP-8 Fuel Pipeline and Terminal at Travis AFB

FIGURE 6



CNDDB Occurrences (June 2008) of Sensitive Vernal Pool Crustaceans within 5 Kilometers of the Project Site

FIGURE 7

Graphics/Biology/Travis AFB/vb crustaceans.fh8

amec

CNDDB Occurrences (March 2008) for California Tiger Salamander within 5 Kilometers of the Project Site

FIGURE

8

Graphics/Biology/Travis AFB/cts.fh8

Table 2. Technical Studies for Biological Resources at Travis AFB

Study name	Source	Study Area	Methods	Summary of findings
Final Biological Assessment. Construction and Operation of a Permanent Southwestern United States C-17 Landing Zone at Travis Air Force Base, Solano County, California	Department of the Air Force 2007	Travis AFB C-17 Landing Strip adjacent to the existing landing strip.	Literature review and site-specific surveys for sensitive species	Site-specific surveys identified vernal pools but did not find sensitive plants, invertebrates, or California tiger salamander (CTS) breeding habitat in the project area. It was determined that the site provided CTS upland habitat.
Summary of Rare, Threatened and Endangered Species Associated with Seasonal Wetlands	CH2MHill 2006	Travis AFB (Basewide)	Literature review	Provides distribution of special status species related to vernal pools on Travis AFB based on a compilation of surveys.
Results of Special-Status Vernal Pool Invertebrate Surveys at Travis Air Force Base	EcoAnalysts 2005 and 2006	Travis AFB (Basewide)	Protocol level surveys during wet season, 2004 – 2005 2005 – 2006	Surveys conducted for Delta green ground beetle, Ricksecker's hydrochara, vernal pool fairy shrimp, vernal pool tadpole shrimp, and Conservancy fairy shrimp. Only vernal pool fairy shrimp and vernal pool tadpole shrimp were found on base.
Integrated Natural Resources Management Plan	Travis Air Force Base 2003	Travis AFB (Basewide)	Literature review	Provides information on biological resources at Travis AFB and the management of those resources in relation to base operations.
Critical Habitat, Survey of Area 1	Earth Tech 2000	Western Travis AFB including Aero Club and surrounding areas	Literature review and observational assessments made in May 1999	Mapped 235 vernal pools, 13 vernal swales, and 1 seasonal wetland and collected observational data on sensitive species. Found Contra Costa goldfields in 10% of vernal pools mapped. Did not find sensitive wildlife other than burrowing owl and loggerhead shrike.
Formal Endangered Species Consultation on the Proposed Burke Property Housing Project at Travis Air Force Base, Solano County, California	USFWS 1999	Burke Property at the northern boundary of Travis AFB	Literature review and site-specific surveys for sensitive species	Site-specific surveys found vernal pools with adult vernal pool fairy shrimp and CTS larvae. Two individual Contra Costa goldfields were identified as well.

Table 3. Technical Studies Performed for the Proposed Action

Study name	Source	Study Area	Location of Document	Summary of findings
Hydrological Assessment for the Travis AFB Fuel Storage Tank and Pipeline Project	CH2MHill 2009	Travis Terminal Area	Appendix D	Assessment of surface water flow impacts resulting from construction of permanent structures for the Proposed Project. Due to high clay content of soils, hydrologic alterations of Travis Terminal will not be significant.
Preliminary Determination and Delineation of Jurisdictional Waters of the United States. JP-8 Fuel Pipeline and Tank Farm at Travis AFB.	AMEC 2009	Proposed Action Area and 250-foot buffer	Appendix E	Identified 11.17 acres of wetland and 1.18 acres of non-wetland waters of the United States within the project area.
Rare Plant Survey Report for the JP-8 Jet Fuel Tank Farm and Pipeline at Travis AFB	Restoration Resources 2008	Proposed Action Area and 250-foot buffer	Appendix F	Contra Costa goldfields were identified in 21 vernal pools within the project area. Estimated populations ranging from 2 plants to 35,000 plants.
Site Assessment for Sensitive Vernal Pool Crustaceans for the Jetfuel Pipeline and Tank Project, Travis AFB, Solano County, California	Garcia and Associates 2008a	Proposed Action Area and 250-foot buffer	Appendix G	Identified one historical occurrence of vernal pool fairy shrimp and vernal pool tadpole shrimp within 0.25 mile of the project area. Identified potential habitat within vernal pools, swales, ditches, and other features that showed evidence of ponded water.
Site Assessment for California Tiger Salamander (*Ambystoma californiense*) for the Jetfuel Pipeline and Tank Project, Travis AFB, Solano County, California	Garcia and Associates 2008b	Proposed Action Area and 250-foot buffer	Appendix H	Identified one historical occurrence of CTS within 2 kilometers of the project area. Identified potential breeding habitat within vernal pools, swales, ditches, and other features that showed evidence of ponded water.
Additional Site Assessments for California Tiger Salamander along the Travis Terminal and Travis Pipeline Route.	Dr. H.B. Shaffer (UC Davis) Chris Searcy (UC Davis) Ray Hasey (Natural and Cultural Resources Manager, Travis AFB)	Proposed Action Area	Personal Communication with Ray Hasey (June 10, 2009)	California Tiger Salamander habitat assessment conducted Dr. H.B. Shaffer and Chris Searcy from UC Davis in the project area on May 12, 2009. A determination was made that vernal pools thought to be breeding habitat (as observed from aerial imagery) were not wet for more than 90 days, and therefore would not likely provide breeding habitat for the species. Subsequent fossorial mammal burrow surveys performed by Ray Hasey in July 2009 were negative in the project area. It was therefore determined that upland habitat for the species was likely absent from the project area.

Table 4. Species List Obtained from USFWS Sacramento Ecological Services Field Office

Common Name (Scientific Name)	Listing Status	Critical Habitat in Action Area	Habitat Requirements	Potential for Occurrences in Action Area
Plants				
Solano grass (*Tuctoria mucronata*)	Endangered	None listed	Occurs in vernal pools. Prefers alkaline soils, alkaline grasslands, large, deep vernal pools, relatively undisturbed habitat.	**Absent:** Has not been identified and habitat conditions do not exist on base according to Travis AFB (2003).
Contra Costa goldfields *(Lasthenia conjugens)*	Endangered	Yes: North and South of Railway west of Travis AFB	Drying borders of vernal pools and seasonally wet grasslands. Generally abundant in northwest corner of base and at southwest end of main runway.	**Present:** Identified in, and adjacent to, the project area during Rare Plant Surveys (Restoration Resources 2008).
Suisun thistle (*Cirsium hydrophilum var. hydrophilum*)	Endangered	Proposed	Salt marsh	**Absent:** No salt marsh habitat on Travis AFB.
Soft bird's-beak *(Cordylanthus mollis ssp. mollis)*	Endangered	Proposed	Salt marsh	**Absent:** No salt marsh habitat on Travis AFB.
Colusa grass *(Neostapfia colusana)*	Threatened	None listed	Occurs in vernal pools, vernal lakes, and playa-type pools. Occurs in Olcott lake in Jepson Prairie. Prefers alkaline soils, alkaline, grasslands, large, deep vernal pools, and relatively undisturbed habitat.	**Absent:** Has not been identified and habitat conditions do not exist on base according to Travis AFB (2003).
San Joaquin Valley Orcutt grass *(Orcuttia inaequalis)*	Threatened	None listed	Vernal pools	**Low:** Not identified in the project area during Rare Plant Surveys (Restoration Resources 2008).

Table 4. Species List Obtained from USFWS Sacramento Ecological Services Field Office

Common Name (Scientific Name)	Listing Status	Critical Habitat in Action Area	Habitat Requirements	Potential for Occurrences in Action Area
Invertebrates				
Conservancy fairy Shrimp *(Branchinecta conservation)*	Endangered	Yes: North and South of Railway west of Travis AFB	Found in large playa-type vernal pools.	**Low/Moderate:** Large playa pools are potentially present adjacent to the project area. Species has not been identified on base according to Travis AFB (2003) but is known to occur on Wilcox Ranch to the east.
Vernal pool fairy shrimp *(Branchinecta lynchi)*	Threatened	Yes: North and South of Railway west of Travis AFB	Found in vernal pools and a variety of temporary aquatic habitats.	**High:** Habitat is available in project area. Adults and eggs found in vernal pools on base according to Travis AFB (2003).
Vernal pool tadpole shrimp *(Lepidurus packardi)*	Endangered	Yes: North and South of Railway west of Travis AFB	Found in vernal pools and a variety of temporary aquatic habitats.	**Moderate:** Habitat is available in project area. Species has not been identified on base according to Travis AFB (2003) but has been identified on private property north of the railway line adjacent to Air Base Parkway (CNDDB).
Delta green ground beetle *(Elaphrus viridis)*	Threatened	Yes: East of Travis AFB	Near vernal pools	**Low/Moderate:** Habitat is available in the project area. The species has not been identified on base according to Travis AFB (2003), but is found on Wilcox Ranch to the east (CNDDB).
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	Threatened	None listed	These beetles only occur in elderberry trees in California.	**Absent:** There are no elderberry trees at Travis AFB. Has not been identified on base according to Travis AFB (2003).
Fish				
Green sturgeon *(Acipenser medirostris*)	Threatened	None listed	Spawns in the Sacramento River and the Klamath River.	**Absent:** No habitat found on or adjacent to Travis AFB.

Table 4. Species List Obtained from USFWS Sacramento Ecological Services Field Office

Common Name (Scientific Name)	Listing Status	Critical Habitat in Action Area	Habitat Requirements	Potential for Occurrences in Action Area
Delta smelt (*Hypomesus transpacificus*)	Threatened	None in area	Sacramento-San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay.	**Absent:** No habitat found on or adjacent to Travis AFB.
Central Valley Chinook salmon *(Oncorhynchus tshawytscha)*	Threatened (Central Valley spring-run) Endangered (Sacramento River winter-run)	None in area	Federal listing refers to populations spawning in Sacramento River and tributaries.	**Absent:** No habitat found on or adjacent to Travis AFB.
Central Valley steelhead *(Oncorhynchus mykiss)*	Threatened	None in area	San Francisco and San Pablo Bay basins.	**Absent:** No habitat found on or adjacent to Travis AFB.
Amphibians				
California tiger salamander *(Ambystoma californiense)*	Threatened	East of Travis AFB	Requires vernal pools or other seasonal water sources for breeding. Requires underground refuges, especially ground squirrel burrows, for adult life stages.	**Low**: No potential breeding pools in project vicinity and upland habitat lacking fossorial mammal burrows in the project area.
California redlegged frog *(Rana aurora Draytonii)*	Threatened	None listed	Occurs in pools of streams, marshes, and sometimes in ephemeral ponds and grasslands.	**Low:** Has not been identified on base according to Travis AFB (2003).
Reptiles				
Giant garter snake (*Thamnophis gigas*)	Threatened	None listed	Occurs in rice production zones in the Central Valley, also occurs west of Yolo bypass in Solano County. Riparian habitats, small pools, and drains.	**Low:** Has not been identified on base according to Travis AFB (2003).
Birds				
California clapper rail *(Rallus longirostris obsoletus)*	Endangered	None listed	Salt-water & brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay.	**Absent:** No salt marsh habitat on Travis AFB.

Table 4. Species List Obtained from USFWS Sacramento Ecological Services Field Office

Common Name (Scientific Name)	Listing Status	Critical Habitat in Action Area	Habitat Requirements	Potential for Occurrences in Action Area
Mammals				
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	Endangered	None listed	Only in the saline emergent wetlands of San Francisco Bay and its tributaries.	**Absent:** No salt marsh habitat on Travis AFB.

Based on habitat availability and known locations of species in the Action Area, six of the species listed in Table 4 have at least moderate potential to be affected by the Proposed Action. These six species include the following, and are further described in Sub-section 4.3:

- Contra Costa goldfields (Endangered)
- California tiger salamander (Threatened)
- Vernal pool fairy shrimp (Threatened)
- Vernal pool tadpole shrimp (Threatened)
- Conservancy fairy shrimp (Endangered)
- Delta green ground beetle (Threatened)

4.2.1 Contra Costa Goldfields – *Lasthenia conjugens*

4.2.1.1 Species Description and Listing Status

Contra Costa goldfields was listed on June 18, 1997 as endangered (62 CFR 34029-34038). Critical habitat was designated in 2005 for this species (70 CFR 46924-46999). The USFWS published a recovery plan that included this species entitled *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

4.2.1.2 Life History and Ecology

Contra Costa goldfields is an annual plant with a strong association to vernal pools. In addition to vernal pools, this species is associated with swales, moist flats, and grassland areas (CNDDB 2008). Seed germination of Contra Costa goldfields tends to be in response to initial wet season rains in October or November (Collinge 2003; USFWS 2005). The flowering period generally lasts from March to June (Skinner and Pavlik 1994; USFWS 2005). Pollination is attributed to insects belonging to five different orders: Coleoptera, Diptera, Hemiptera, Hymenoptera, and Lepidoptera (Thorp and Leong 1998). Most of these pollinators are generalists (pollinating a wide variety of flowering species); however, Thorp and Leong (1998) noted solitary bees (family Andrenidae) as pollinators of Contra Costa goldfields. Because of the lack of a seed pappus or seed hairs on the

achenes, wind dispersal of seeds is unlikely. The maximum viability of seed in the ground is unknown; however, because population fluctuations by several orders of magnitude at a particular site have been observed over different seasons, the seeds may be somewhat resilient and form a component of a site's seed bank (USFWS 2005).

4.2.1.3 Distribution and Threats

The Contra Costa goldfields occurred historically in seven vernal pool regions: Central Coast, Lake-Napa, Livermore, Mendocino, Santa Barbara, Santa Rosa, and Solano-Colusa (USFWS 2005).

Threats to this species correspond to general threats to vernal pool ecosystems including habitat loss and fragmentation, altered hydrology, contaminants, decline of pollinators, improper livestock grazing, environmental change, disease, inappropriate natural resource management activities, and inadequate regulatory mechanisms (USFWS 2005). More specific threats to Contra Costa goldfields include grassland conversion to vineyards and competition from invasive species.

4.2.1.4 Status within the Action Area

Rare plant surveys conducted by Biosystems (1994 from CH2MHill 2006) counted 36 separate occurrences on Travis AFB concentrated in the western portion. The majority of plants (33 of 36 plants) were located at the former Aero Club or in the grazing areas south of the Aero Club. The remaining occurrences are found in the southwestern corner of the Base along Perimeter Road at the end of the runway (CH2MHill 2006).

Contra Costa goldfields occur within grazing lands west of the primary Travis AFB property boundary, and small populations occur within the decommissioned railway right-of-way (Figure 6).

Rare Plant Surveys by Restoration Resources (2008) (Appendix F) identified 21 vernal pools within and adjacent to the Action Area that contain populations of Contra Costa goldfields (Figure 6).

Critical habitat for this species occurs between the western edge of the Travis AFB boundary and Walters Road. The decommissioned railway right-of-way is excluded from critical habitat, however, as it lies within Travis AFB property and is covered by the base INRMP.

4.2.2 California Tiger Salamander – *Ambystoma californiense*

4.2.2.1 Species Description and Listing Status

The California tiger salamander was listed on August 4, 2004 as Threatened throughout its range (69 CFR 47211-47248). The USFWS decision to downlist the Sonoma and Santa Barbara populations from Endangered to Threatened was reversed in U.S. District Court on August 19, 2005. Therefore, the Sonoma and Santa Barbara populations are listed as Endangered. On August 23, 2005, critical habitat was designated in 19 counties

for the central population, amounting to 199,109 acres (70 CFR 49379). Critical habitat does not occur in the vicinity of the Action Area.

The California tiger salamander is an amphibian in the family Ambystomatidae, endemic to California and native to Solano County. It is a large terrestrial salamander with a broad, rounded snout and white or pale yellow spots or bars on a black background on the back and sides. The belly varies from almost uniform white or pale yellow to a variegated pattern of white or pale yellow and black.

4.2.2.2 Life History and Ecology

Breeding of adult California tiger salamanders has been observed following the onset of warm rains (November through late December) (Storer 1925; Barry and Schaffer 1994). Males and females nocturnally migrate up to 1 mile or more from subterranean refugia to egg deposition sites, which include vernal pools with substantial hydroperiods (Austin and Schaffer 1992; Loredo et al. 1996; Twitty 1941; Andersen 1968).

Salamander embryos hatch approximately 2 to 4 weeks after egg deposition, and the aquatic larvae require a 10-12 week metamorphosis period before developing into the juvenile form. Following metamorphosis (normally early May through July), juveniles emigrate from drying breeding ponds in mass group migrations (Holland et al. 1990).

Soon after spawning, adult salamanders will return to aestivation habitats (small mammal burrows), where they spend approximately 9 to 10 months until the next winter rains (Barry and Schaffer 1994; Loredo et. al 1996; Jennings 2005). Associated upland habitat containing underground refugia is essential for the survival of adult California tiger salamanders and juveniles that have recently undergone metamorphosis.

4.2.2.3 Distribution and Threats

This species is restricted to California and does not overlap with any other species of tiger salamander. California tiger salamanders are restricted to vernal pools and seasonal ponds, including many constructed stockponds, in grassland and oak savannah plant communities from sea level to about 1,500 feet above mean sea level in central California. In the coastal region, populations are scattered from Sonoma County in the northern San Francisco Bay Area to Santa Barbara County, and in the Central Valley and Sierra Nevada foothills from Yolo to Kern Counties. The Sonoma population appears to have been geographically isolated from the remainder of the California tiger salamander population by distance, mountains, and major waterway barriers for more than 700,000 years.

The primary cause of the decline of California tiger salamander populations is the loss and fragmentation of habitat from human activities, and the encroachment of non-native predators. All of the estimated seven genetic populations of this species have been significantly reduced because of urban and agricultural development, land conversion, and other human-caused factors. Reduction of ground squirrel populations to low levels through widespread rodent control programs may reduce availability of burrows and adversely affect the California tiger salamander. Various non-native subspecies of the

tiger salamander have been imported into California for use as fish bait. The introduced salamanders may out-compete the California tiger salamanders, or interbreed with them to create hybrids. Automobiles and off-road vehicles kill a significant number of migrating California tiger salamanders, and contaminated runoff from roads, highways, and agriculture may adversely affect them.

4.2.2.4 Status Within the Action Area

Known breeding locations for the California tiger salamander within Travis AFB are located approximately 1.5 miles from the Proposed Action on the Burke Property (USFWS 1999, Garcia and Associates 2008b) (Figure 8). Habitat assessments conducted by Dr. H.B. Schafer and Chris Searcy, of the University of California Davis, on May 12, 2009 determined that potential breeding pools in the Proposed Action area identified through aerial imagery did not provide sustained hydroperiods required by the species to allow for breeding conditions (Hasey 2009). Subsequent fossorial mammal burrow surveys performed by Ray Hasey in July 2009 were negative in the project area. It was therefore determined that upland habitat for the species was likely absent from the Proposed Action area (Hasey 2009). Critical habitat for this species does not occur within the Proposed Action area.

This species has a low potential to occur in the Proposed Action area due to habitat restrictions, and is therefore not likely to be affected by the Proposed Action.

4.2.3 Vernal Pool Fairy Shrimp – *Branchinecta lynchi*

4.2.3.1 Description and Listing Status

The vernal pool fairy shrimp (*Branchinecta lynchi*) was listed on September 19, 1994 (59 CFR 48136) as Endangered. Critical habitat was designated on August 6, 2003 (68 CFR 46683) and subsequently revised with critical habitat unit designations on February 10, 2006 (71 CFR 7117). The species is included in the recovery plan entitled *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

4.2.3.2 Life History and Ecology

Vernal pool fairy shrimp inhabit small, clear, sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools (CNDDB 2008). Helm (1998) determined that this species reaches sexual maturity on average in 41 days, but may be as few as 18 days at optimal conditions. Life cycles are reported to range from 63 to 147 days, demonstrating that growth rates are dependent on water temperature.

4.2.3.3 Distribution and Threats

The historical distribution of this species is not known (USFWS 2005); however, the distribution of vernal pool habitats in the areas where this species is not known to occur was once more continuous and larger in area than it is today (Holland 1998). It is likely the vernal pool fairy shrimp once occupied vernal pool habitats throughout a large portion of the Central Valley and southern coastal regions of California (USFWS 2005). Holland

(1978) estimated that nearly 4,000,000 acres of vernal pool habitat existed in the Central Valley prior to intensive land use practices of the mid-1800s.

In the Solano-Colusa Vernal Pool Region, populations of this species are threatened by development on private land, particularly near Fairfield and Vacaville, as well as invasive predator fish introductions.

4.2.3.4 Status Within the Action Area

Vernal pool fairy shrimp have been identified at 24 locations on Travis AFB according to CH2MHill (2006), including within vernal pools north of ERP Site LF044, vernal pools within the vicinity of the Aero Club, and along the decommissioned railway line on the north side of Hangar Avenue (Figures 5 and 7).

Critical habitat for this species occurs between the western edge of the Travis AFB boundary and Walters Road (Figure 7). The decommissioned railway right-of-way is excluded from critical habitat, however, as it lies within Travis AFB property and is covered by the base INRMP.

Vernal pools and swales within and adjacent to the Action Area may support suitable habitat for the vernal pool fairy shrimp (Garcia and Associates 2008a) (Appendix G). The species has not been detected within the railway right-of-way west of Hangar Avenue.

4.2.4 Vernal Pool Tadpole Shrimp – *Lepidurus packardi*

4.2.4.1 Description and Listing Status

The vernal pool tadpole shrimp (*Lepidurus packardi*) was listed on September 19, 1994 (59 CFR 48136) as Endangered. Critical habitat was designated on August 6, 2003 (68 CFR 46683) and subsequently revised with critical habitat unit designations on February 10, 2006 (71 CFR 7117). The species is included in the recovery plan entitled *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

4.2.4.2 Life History and Ecology

Vernal pool tadpole shrimp inhabit vernal pools commonly found in unplowed grasslands and can occur in mud-bottomed pools that are highly turbid (CNDDB 2008). Helm (1998) determined that this species reaches sexual maturity on average in 54 days. Life cycles are reported to last longer than other vernal pool crustaceans and have relatively higher reproduction rates.

4.2.4.3 Distribution and Threats

The historical distribution of this species is not known (USFWS 2005); however, the distribution of vernal pool habitats in the areas where this species is not known to occur were once more continuous and larger in area than they are today (Holland 1998). It is likely the vernal pool tadpole shrimp once occupied vernal pool habitats throughout a large portion of the Central Valley and southern coastal regions of California (USFWS 2005).

In the Solano-Colusa Vernal Pool Region, populations of this species are threatened by development on private land, particularly near Fairfield and Vacaville, as well as invasive predator fish introductions.

4.2.4.4 Status Within the Action Area

Vernal pool tadpole shrimp have not been found within the boundaries of Travis AFB (CH2MHill 2006). They have, however, been found along the northern and southern boundary of the base including a vernal pool on private property near the corner of Walters Road and Air Base Parkway (Garcia and Associates 2008a) (Figure 7).

Critical habitat for this species occurs between the western edge of the Travis AFB boundary and Walters Road (Figure 7). The decommissioned railway right-of-way is excluded from critical habitat, however, as it lies within Travis AFB property and is covered by the base INRMP.

Vernal pools and swales within and adjacent to the Action Area may support suitable habitat for the vernal pool tadpole shrimp (Garcia and Associates 2008a), although past surveys in the project area have not detected the species.

4.2.5 Conservancy Fairy Shrimp – *Branchinecta conservatio*

4.2.5.1 Species Description and Listing Status

The Conservancy fairy shrimp (*Branchinecta conservatio*) was listed on September 19, 1994 (59 CFR 48136) as Endangered. Critical habitat was designated on August 6, 2003 (68 CFR 46683) and subsequently revised with critical habitat unit designations on February 10, 2006 (71 CFR 7117). The species is included in the recovery plan entitled *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

4.2.5.2 Life History and Ecology

Conservancy fairy shrimp inhabit vernal pools located in swales formed by old, braided alluvium and filled by winter and spring rains that last until June (CNDDB 2008). Helm (1998) determined that this species reaches sexual maturity on average in 46 days, and live as long as 154 days, although growth rates are dependent on water temperature.

4.2.5.3 Distribution and Threats

The historical distribution of this species is not known (USFWS 2005); however, the distribution of vernal pool habitats in the areas where this species is known to occur were once more continuous and larger in area than they are today (Holland 1998). It is likely the Conservancy fairy shrimp once occupied vernal pool habitats throughout a large portion of the Central Valley and southern coastal regions of California (USFWS 2005).

In the Solano-Colusa Vernal Pool Region, populations of this species are threatened by development on private land, particularly near Fairfield and Vacaville, as well as invasive predator fish introductions.

4.2.5.4 Status Within the Action Area

Surveys for special status invertebrates have never detected this species on Travis AFB (CH2MHill 2006). Known sightings of Conservancy fairy shrimp are shown in Figure 7. Critical habitat for this species occurs between the western edge of the Travis AFB boundary and Walters Road (Figure 7). The decommissioned railway right-of-way is excluded from critical habitat, however, as it lies within Travis AFB property and is covered by the base INRMP.

According to Garcia and Associates (2008a) (Appendix G), only one vernal pool within the Action Area (south of the proposed Travis Terminal) has characteristics that may support Conservancy fairy shrimp.

4.2.6 Delta Green Ground Beetle – *Elaphrus viridis*

4.2.6.1 Species Description and Listing Status

The Delta green ground beetle (*Elaphrus viridis*) was listed on August 8, 1980 (45 CFR 62807) as Threatened. Critical habitat was designated on August 8, 1980 (45 CFR 52807). This species was included in a recovery plan published in 1985; however, the USFWS updated recovery planning for the Delta green ground beetle by publishing a recovery plan that included this species entitled *Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon* (USFWS 2005).

The Delta green ground beetle belongs to the family Carabidae. Most adults are about 0.25 inch long. They are bright metallic green, generally with bronze spots on the elytra; however, some lack the bronze spots (Goulet 1983).

4.2.6.2 Life History and Ecology

The preferred habitat of the Delta green ground beetle is not well understood. Some entomologists believe the species prefers more open habitats in the grassland-playa pool matrix where the beetle is found, such as edges of pools, trails, roads, and ditches. However, this may be because denser cover hinders observation of the beetles elsewhere. Adults may also occur in the surrounding grasslands. Adults seem to be active from February until mid-May, after which they enter an inactive phase called a diapause.

4.2.6.3 Distribution and Threats

Researchers have collected adult beetles around the margins of vernal pools and in bare areas along trails and roadsides in central Solano County (USFWS 2005). The cryptic coloration of the beetle against the brilliant green of the early spring grass and its small size and habit of hiding under low-growing vegetation such as filaree (*Erodium* spp.), hinder detection of the animal in the field.

The Delta green ground beetle has not been found within the boundaries of Travis AFB (CH2MHill 2006). They have, however, been found southeast of the base on Wilcox Ranch (The Nature Conservancy 2002).

The widespread loss of wetlands habitat in the Central Valley since the mid-1800s suggests the range of this vernal pool-associated species has been reduced and fragmented by human activities, especially agricultural practices and hydrological manipulations (USFWS 2005). Holland (1978) estimated that nearly 4,000,000 acres of vernal pool habitat existed in the Central Valley prior to intensive land use practices of the mid-1800s.

4.2.6.4 Status Within the Action Area

Surveys were conducted by EcoAnalysts on Travis AFB in 2005, and the species was not found (CH2MHill 2006). The nearest known location of the beetle to the Action Area is over 2 miles to the southeast of the Proposed Action on the Wilcox Ranch (TNC 2002). It is unlikely that the species would migrate from the Wilcox Ranch to Travis AFB since they are typically not found more than 500 feet from an occupied pool edge (EcoAnalysts 2005).

5.0 EFFECTS OF THE PROPOSED ACTION ON LISTED SPECIES

5.1 Direct Effects

Direct effects are considered those effects that occur at or at the time of the Proposed Action (USFWS 1998). A construction activity may be described as initiating a temporary effect or a permanent effect, depending on each construction activity component. These direct effects would be limited to the Travis Terminal, Travis Pipeline, and Travis Junction construction activities. No new utility infrastructure will be constructed outside of the construction footprint. Construction elements were designed to avoid extant vernal pool locations based on wetland delineations conducted by AMEC (2009).

Figure 9 shows portions of the Action Area subject to temporary and permanent forms of direct effects based on construction designs described in Section 2. Figure 10 shows a close-up view of the eastern portion of the Proposed Action encompassing the Travis Terminal and the Travis Pipeline locations, including HDD entry area and conventional trenching construction operations. Figure 11 shows a close up view of the western portion of the Proposed Action including HDD exit area and the Travis Junction.

Siting of the Travis Terminal avoids direct impact of vernal pools in the Action Area (Figure 10). Travis Pipeline construction was designed to bore beneath vernal pool complexes within the western portion of Travis AFB and properties west of Travis AFB (Figure 9). Impacts to jurisdictional waters would be limited to temporary placement of soil stockpiles in the south railway drainage ditch during HDD exit area staging, conventional trenching of the Travis Pipeline to the west, and construction of the Travis Junction (Figure 11). Temporary impacts to the drainage ditches include 0.054 acre. Permanent impacts to jurisdictional waters would be limited to the south railway drainage ditch for construction of the Travis Junction facility (0.017 acre of impact to drainage ditch) (Figure 11).

5.1.1 Temporary Direct Effects

For the purposes of this BA, temporary direct effects are defined as direct effects that may be restored within 1 year of initial disturbance. Construction activities associated with temporary direct effects include the following components:

- **Travis Terminal** – Construction of the Travis Terminal would include grading activities outside of the perimeter access road (identified as Temporary Impact Area in Figure 10). The temporary impact of site preparation activities for the Travis Terminal includes 0.77 acre (not including the permanent impact footprint of the Travis Terminal as described in Section 5.1.2) which would be graded, leveled, and revegetated within 1 year.

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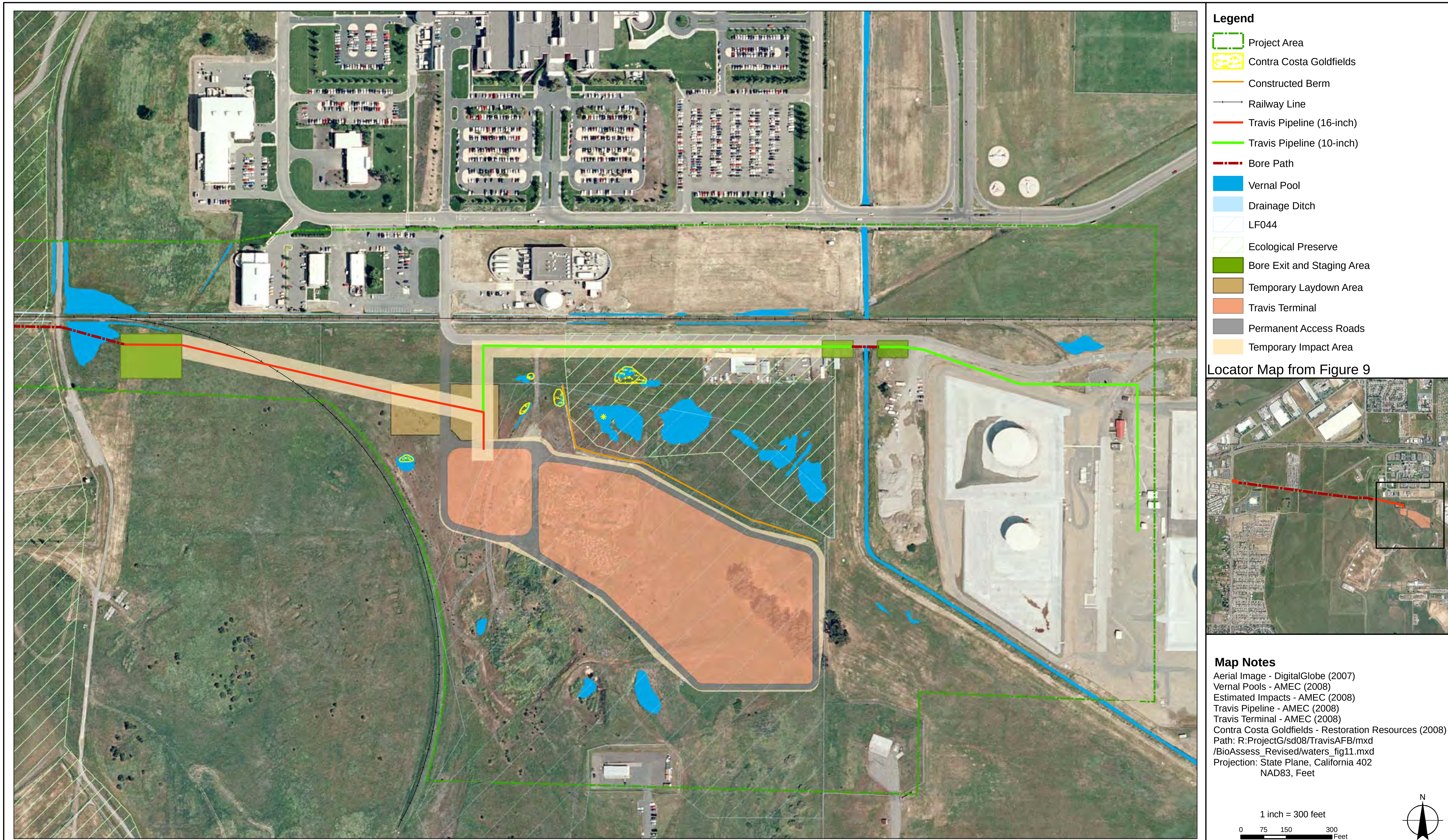
Impact Assessment
JP-8 Pipeline and Terminal at Travis AFB

FIGURE 9



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Impact Assessment - Travis Terminal & Pipeline
JP-8 Pipeline and Terminal at Travis AFB

FIGURE
10

Legend

- Contra Costa Goldfields
- Railway Line
- Existing Fence
- Bore Path
- Travis Pipeline (16-inch)
- Bore Exit and Staging Area
- Travis Junction
- Vernal Pool
- Drainage Ditch
- Temporarily Impacted Drainage Ditches
- Permanently Impacted Drainage Ditches
- Temporary Impact Area
- Permanent Impact Area
- Existing Disturbed Area

Locator Map from Figure 9

Map Notes

Aerial Image - DigitalGlobe (2007)
Vernal Pools - AMEC (2008)
Estimated Impacts - AMEC (2008)
Travis Pipeline - AMEC (2008)
Travis Terminal - AMEC (2008)
Contra Costa Goldfields - Restoration Resources (2008)
Path: R:ProjectG/sd08/TravisAFB/mxd
/BioAssess_Revised/impact_assess_junction.mxd
Projection: State Plane, California 402
NAD83, Feet

1 inch = 50 feet

0 12.5 25 50 Feet

N

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Impact Assessment - Travis Junction & Pipeline
JP-8 Pipeline and Terminal at Travis AFB

FIGURE

11

- **Travis Pipeline** – HDD entry and exit staging areas would require temporary disturbance of 0.90 acre (Figures 9, 10, and 11). Conventional trenching activities in unpaved areas (primarily west of Union Creek) for the 16-inch and 10-inch Travis Pipelines would require a temporary disturbance of 4.21 acres (Figures 10 and 11). The Travis Pipeline Action Area would be restored to pre-construction contours and revegetated within 1 year.
- **Travis Junction** – Construction of the Travis Junction at the western edge of the project (Figure 11) would include temporary disturbance of 0.11 acre primarily along the north side of the existing railway. The temporary disturbance area would be restored to pre-construction contours and revegetated within 1 year.
- **Access and Staging** – Access would come from existing roadways and the raised railway bed itself, and is therefore not included in temporary or permanent impact calculations. Staging areas at the northern edge of the Travis Terminal and within the existing railway west of Walters Road include temporary disturbance of 1.30 acres and 0.60 acre, respectively (Figure 9). Temporary staging areas would be restored to pre-construction conditions within 1 year.
- **Impacts to waters of the U.S.** – Of the 12.35 acres of jurisdictional waters of the U.S. delineated in the project area of the Proposed Action by AMEC (2009) (Appendix E), 0.054 acre of railway drainage ditch would be temporarily impacted during HDD exit staging, conventional trenching for the Travis Pipeline, and construction of the Travis Junction (Figure 11). The temporary disturbance area would be restored to pre-construction conditions within 1 year.

5.1.2 Permanent Direct Effects

For the purposes of this BA, permanent direct effects are defined as direct effects that will forever remove elements that comprise a species' habitat. Construction activities associated with permanent direct effects include the following components:

- **Impacts to waters of the U.S.** – Of the 12.35 acres of jurisdictional waters of the U.S. delineated in the project area of the Proposed Action (AMEC 2009), 0.017 acre of the south railway drainage ditch at the Travis Junction would be the only water permanently impacted by construction (Figure 11).

5.2 Indirect Effects

Indirect effects are defined under the ESA as "…those effects that are caused by, or will result from the Proposed Action later in time, but are still reasonably certain to occur…." (50 CFR 402.02). Indirect effects of the Proposed Action are most likely limited to the potential for alteration of surface hydrology, affecting areas downstream or downslope of the area of direct effect.

The water restrictive layer in Northern claypan vernal pools, like the ones found on Travis AFB, is formed by a surface clay layer rather than a duripan type subsurface structure (Williamson et al. 2005). Vernal pool hydrology is therefore controlled primarily by surface water runoff (Marty pers. com. 2008; McCarten pers. com. 2008; Williamson et al. 2005).

5.2.1 Travis Terminal

An Ecological Preserve containing vernal pools with known Contra Costa goldfields and vernal pool fairy shrimp populations lies north of the proposed Travis Terminal (Figure 10). The Ecological Preserve, however, is currently separated from the proposed Travis Terminal by a raised berm in order to prevent the transport of soil contamination from ERP Site LF044 via surface water flow during rain events into the vernal pools. The change in surface water hydrology, as described in the hydrological assessment (Appendix D) conducted by CH2MHill (2009), is therefore not likely to affect the vernal pools in the Ecological Preserve. Small vernal pools adjacent to the existing roadway to the north and west of the proposed terminal that contain Contra Costa goldfields (Figure 10) would most likely be unaffected by the addition of impervious cover because of the shallow topography of the pools and small drainage area supplying those pools. Surface water flows would be directed around raised roadbeds surrounding the Travis Terminal and would, therefore, be unlikely to significantly alter the hydrology of the existing pools located adjacent to the terminal.

Small vernal pools at the southern edge of the Travis Terminal (Figure 10) would most likely be unaffected by construction operations, as their southward-flowing drainage areas would remain intact.

5.2.2 Travis Pipeline

HDD entry and exit staging areas would be restricted to a 0.90-acre area (Figure 7). Impacts for the HDD exit staging area within the railway right of way near Walters Road would include temporary impacts to 0.037 acre of railway drainage ditch. Conventional trenching activities would require temporary impacts along the 75-foot right-of-way for the 16-inch pipeline, and along a 50-foot right-of-way for the 10-inch pipeline along the south side of Hangar Avenue (Figure 9). Pipeline construction would be limited to the dry season (April 16 through October 15), and the Travis Pipeline Action Area would be restored to pre-construction conditions and revegetated within 1 year of initial disturbance. The Travis Pipeline construction is, therefore, unlikely to alter hydrology in the Action Area and would have no significant indirect effects.

5.2.3 Travis Junction

Construction of the Travis Junction at the western edge of the project (Figure 11) would include temporary disturbance of 0.11 acre of railroad right of way adjacent to Walters Road. The area on the north side of the railway (including 0.017 acre of drainage ditch) would be restored to pre-construction contours and revegetated within 1 year, and therefore have no significant indirect effects on hydrology.

The southern railway drainage ditch (0.017 acre) would be permanently affected by the construction of the Travis Junction. Water flow in the south railway ditch would be diverted into the north railway ditch at the eastern edge of the Travis Junction and continue into the roadside ditch at Walters Road. Diversion of this water is unlikely to significantly alter hydrology in the project area and would, therefore, have minimal indirect effects.

5.2.4 Access and Staging

Access and staging for Proposed Action would come from existing roadways and the raised railway bed itself, and would therefore be unlikely to have indirect effects on hydrology in the Action Area.

Construction of the Travis Terminal will require permanent access from Hangar Avenue south to the temporary staging area and the terminal itself (Figure 11). Addition of impermeable surfaces in this area, where clay soils already predominate, is unlikely to alter hydrology significantly. The 1.30-acre temporary staging area for the Travis Terminal (Figure 11) would be restored to pre-construction contours and condition within 1 year of project initiation, and would therefore have no indirect impacts on hydrology in the Action Area.

5.3 Cumulative Effects Analysis

Cumulative effects, as defined by the ESA, are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation (50 CFR 402.02) within the Action Area (50 CFR 402.02). Areas surrounding Travis AFB are within the City of Fairfield's sphere of influence, which is subject to relatively intense development under the city's general plan (USFWS 2005).

The properties adjacent to the north and south of the existing decommissioned railway are privately owned and are in the planning process to be placed in permanent conservation easements to be used as mitigation banks (Tovar pers. com. 2008). Therefore, no cumulative effects arising from future state or private activities are expected to adversely affect listed species and species habitat in the project area.

5.4 Conservation Measures to Offset Direct and Indirect Effects

5.4.1 Compensatory Mitigation

There will be no significant impact to species or habitat for the Proposed Action. Therefore, no compensatory mitigation is required.

5.4.2 Stormwater Control Structures

Stormwater control structures would be included in the design of each aspect of the construction project to reduce scouring, minimize flooding, and improve water quality throughout the Action Area. These hydrological designs would conform to standard BMPs and Standard Operating Procedures for pipeline and terminal construction and operation.

5.4.3 Programmatic Agreements and Base Planning

Travis AFB is in the preliminary scoping stages for developing a California tiger salamander programmatic agreement with the USFWS Sacramento Ecological Services Field Office (Musselwhite pers. com. 2008). To implement a comprehensive strategy for management of California tiger salamander populations and habitat on Travis AFB, the

conservation measures that arise from the consultation process for the Proposed Action will be integrated into the programmatic agreement. Other base-wide natural resource planning documents will include the conservation measures included in this BA, such as updates to the INRMP.

6.0 CONCLUSION

Effects of the Proposed Action on listed species were evaluated based on the following definitions (50 CFR 402.02):

- **No effect** – the appropriate conclusion where the Proposed Action will not affect listed species or critical habitat.
- **Not likely to adversely affect** – the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those effects extremely unlikely to occur.
- **Likely to adversely affect** – the appropriate conclusion if any adverse effect to listed species may occur as a direct or indirect result of the proposed action (including interdependent and interrelated actions), and the effect is not discountable or insignificant.
- **Jeopardize proposed species/adversely modify critical habitat** – the appropriate conclusion if an action would reasonably be expected to directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species by reducing the reproduction, numbers, or distribution of that species, or by modifying critical habitat to the point of preventing the recovery of a listed species.

Based on the definitions above and on the species status descriptions relative to the Proposed Action, this BA concludes the following:

- Direct and indirect impacts on vernal pools containing listed invertebrate species will be avoided by project siting and construction techniques. Temporary and permanent impact to railway drainage ditches at the western edge of the Proposed Action area are not likely to adversely affect listed invertebrate species as they have not been detected in the drainage ditches west of Hangar Avenue. Of the 0.071 acre of drainage ditch proposed for disturbance during Travis Pipeline and Travis Junction construction, 0.054 acre will be restored to pre-construction condition within 1 year. The increase in impervious cover resulting from the construction of the Travis Junction will have no effects on vernal pool hydrology due to the redirection of flows into the north drainage ditch.
- Direct and indirect impacts on vernal pools containing Contra Costa goldfields will be avoided by project siting and construction techniques. The Proposed Action will not significantly impact surface hydrology in the Action Area due to implementation of avoidance and restoration activities. The Proposed Action is, therefore, not likely to adversely affect the Contra Costa goldfields. The constructed berm surrounding sensitive vernal pool resources north of the Travis Terminal location is designed to divert surface flows away from those resources. Therefore, the presence of the

Travis Terminal will not significantly affect surface water hydrology to those vernal pools.

- Delineated jurisdictional waters within the Action Area amount to 12.35 acres (including 11.17 acres of wetlands) (AMEC 2009). These jurisdictional waters include streams, vernal pools, vernal swales, and drainage ditches. A preliminary determination suggests that the Proposed Action will temporarily impact 0.054 acre and permanently impact 0.017 acre of jurisdictional waters (potentially subject to regulation under the CWA), composed entirely of the non-wetland drainage ditches adjacent to the existing railway at the western edge of the Proposed Action area. Therefore, there will be no impacts to wetland resources resulting from the Proposed Action.

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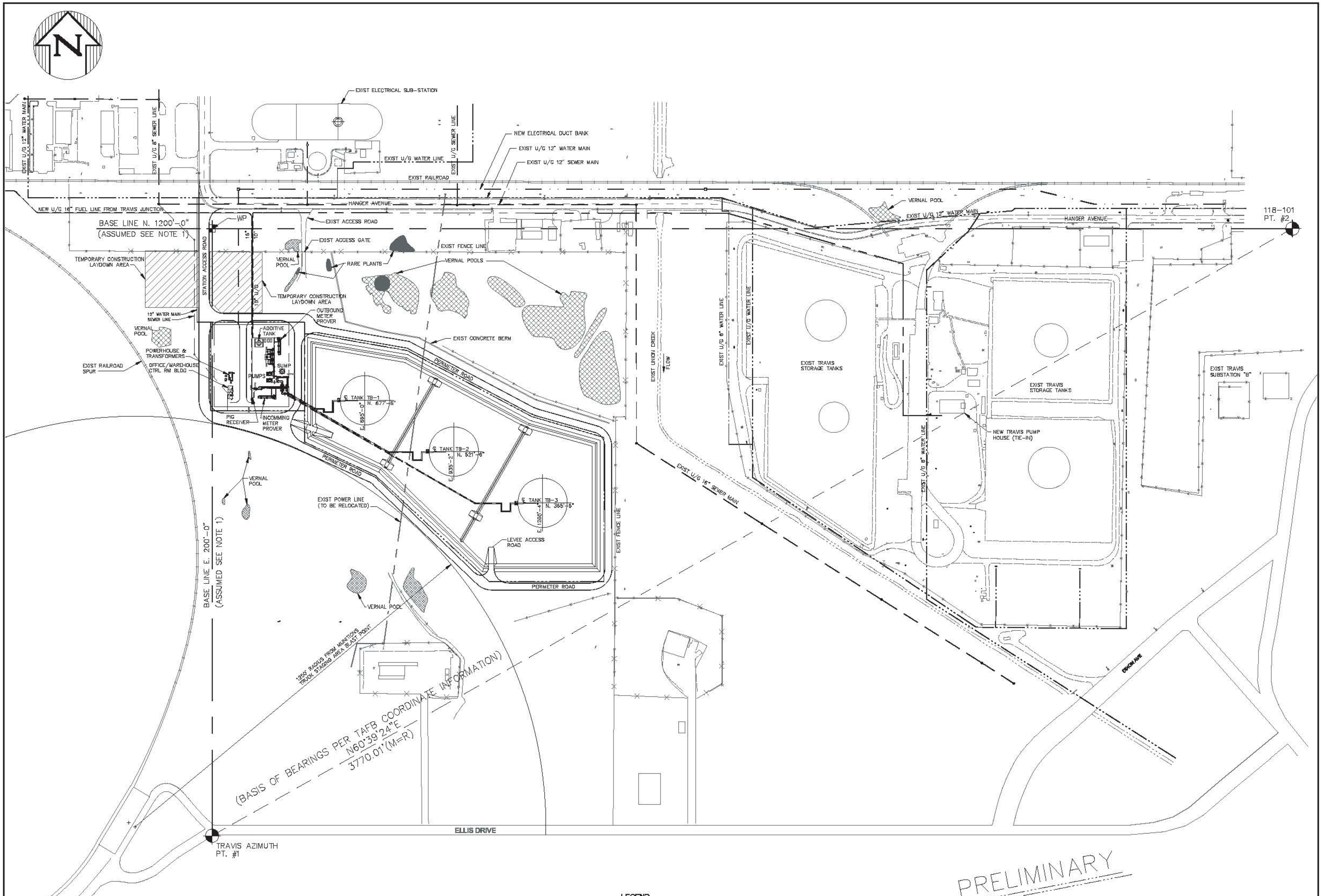
Appendix A
Travis Terminal Design



NOTES:

1. PROJECT COORDINATES AT WP (WORK POINT) N. 1200'-0", E. 200'-0" ARE ASSUMED COORDINATES FOR THIS PROJECT LOCATION.
2. BEARINGS ARE ACTUAL.

CONTROL COORDINATES: (REFERENCE)

POINT#	NORTHING	EASTING	ELEV.	DESCRIPTION
1	1856988.87	6571755.18	89.44	FOUND USGS BRASS DISK-JS4615 [TAFB BRASS DISK-TRAVIS AZIMUTH]
2	1858836.33	6575041.50	59.82	FOUND USGS BRASS DISK-UNKNOWN [TAFB BRASS DISK-118-101]

SURVEY NOTES:

HELD POINT #1 "TRAVIS AZMUTH" FOR HORIZONTAL AND VERTICAL PER TAFB COORDINATE SYSTEM. COORDINATES PROVIDED BY TSgt McComas OF TAFB, SURVEYING AND ENGINEERING SUPPORT, DATED AUGUST 25TH, 2008:
NORTH = 1856988.873, EAST = 6571755.182, ELEV. = 89.443

NAD 83 CAL ZONE II COORDINATES PER NGS DATA SHEET:
NORTH = 1856989.38, E = 6571754.56, ELEV = 90
EPOCH DATE = 2007.00, COMBINED FACTOR (ELEV x SCALE) = 1.00001785
CONVERGENCE = +0°01'19.7"

LEGEND

118-97 USGS AND TRAVIS AIR FORCE BASE CONTROL DISK
= WORK POINT
= RARE PLANT (GOLDFIELD)
= VERNAL POOL
= NEW ELECTRICAL DUCT BANK
= EXIST WATER MAIN
= EXIST SEWER MAIN
= NEW U/G FUEL LINE
= EXIST POWER & COMMUNICATION LNE

1"=100' 100' 50' 0' 100' 200'

NO.	DATE	REVISIONS	BY	CHECK	DESIGN SUPVR	PROJECT ENGINEER	MANAGER
A	12/22/08	ISSUE FOR REVIEW	LRM	XXX	XXX	XXX	XXX

BRINDERSON

SFPP, L.P.
ORANGE CALIFORNIA

DRAWING TITLE: SITE PLAN
TRAVIS BREAK-OUT TANKS
& EQUIPMENT
JOB TITLE: TRAVIS AFB PIPELINE & FUEL TANK

STATION/LOCATION: TRAVIS BREAK-OUT STATION

CADFILE: DWG
VIEW: PLOT
CAD ENGINEER: LRM
DATE: 12/22/08

SCALE: 1" = 100'-0"
WORK ORDER NUMBER 49063

CONSTRUCTION DRAWING NUMBER
E-TB3-XXXXX
REF RECORD DWG NO: E-XX-00-5XXA

FILE: P:\Kinder Morgan\E6175\002 Travis AFB Pipeln & Fuel TK\014 Design\014.03 Piping\014.03.01 Working Folders\Layouts\Travis Break out Tank\TB- Site Plan.dwg
DATE: Feb 12, 2009 2:41pm PLOT BY: bmlchaud

Appendix B
Travis Pipeline Construction Methods

KINDER MORGAN
ENERGY PARTNERS, L.P.

16-inch Pipeline Project Description
Walters Road to TAFB Facility

February 16, 2009
Revision 2

BRINDERSON

Cannon
ASSOCIATES

Bakersfield, CA 661.328.6280
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www.CannonAssociates.us

Issued For Review	
Checked by	
Reviewed by	Brien Vierra

TABLE OF CONTENTS

1 INTRODUCTION

This work described in this document will cover the installation of a pipeline station near Walters Road, installation of approximately 7,200 feet of 16-inch pipe and the installation of a products terminal to serve Travis Air Force Base. The project is located to the east of Fairfield, CA.

Kinder Morgan operates and owns the existing 20-inch pipeline which serves the greater Sacramento area in which this proposed project will connect to.

2 PROJECT LOCATION

The work site is located just east of Fairfield, CA along Walters Road and will parallel an existing, decommissioned, railroad spur that formerly serviced the Air Force Base. The GPS coordinates of the start of the pipeline near Walters Road are Latitude 38˚ 16’ 06”N and Long. 121˚ 59’ 15”W WGS84. The proposed alignment will parallel the existing railroad bed just to the south . Please refer to the attachment “A” and section seven for the proposed approximate location of the pipeline.

3 PROJECT PURPOSE

The purpose for this project is to supply Travis Air Force Base with a new, clean and reliable storage system that can provide JP-8 to the base on an “as needed basis”.

4 PROJECT DESCRIPTION

This project proposes to install modifications at various sites to allow delivery of JP-8 via the Kinder Morgan 20-inch Concord to Sacramento pipeline to a new breakout facility located at Travis Air Force Base. The project is comprised of three main components:

1. Travis Take-Off – Tie-in to the 20-inch Mainline which passes just outside of Travis AFB property. The tie-in will occur along Walters Road.
2. Travis Pipeline – Install approximately 1.4 miles of 16-inch pipe
3. Travis Terminal – Install three 150,000 BBL. Tanks, filtration equipment, metering equipment, proving, additive injection and pumps to transfer JP-8 fuel to existing Travis AFB tankage.

The Travis “Take-Off” will consist of a small area approximately 120 feet long by 50 feet wide (0.14 acres). This area will require the existing 20-inch pipeline to be tied into with a 16-inch branch connection in which the TAFB JP-8 fuel can be shipped through (refer to Attachment “A” for a conceptual drawing of the “Take-Off”). The area will contain an above grade 20-inch valve, three 16-inch valves, associated piping and pig launching facilities (utilized to launch cleaning and inspection tools through the pipeline) as well as a small parking area for maintenance activities. This facility will permanently disturb the

southerly drainage ditch adjacent to the railroad bed. The total permanent disturbance to the drainage ditch is estimated at 100 feet long by 5 feet wide on the southerly side of the existing tracks for a total disturbance of 500 square feet (0.011 acres). Drainage through the area will be maintained by installing a new culvert under the railroad tracks in which the water flow on the southerly side of the tracks near the pig launcher will be diverted to the north side of the tracks then allowed to continue to the west.

The Travis Pipeline will consist of installing approximately 1.4 miles of 16-inch pipe along the southerly side of the existing railroad tracks that were utilized to service TAFB. The pipeline will be buried along its entirety with the exception of the pig launcher and receiver areas as discussed in other portions of this section. The route traverses areas that are environmentally sensitive as indicated on AMEC's Vernal Pool and Rare Plant Survey Figures. Kinder Morgan has reviewed these surveys as well as other studies to try and minimize site disturbance and to avoid any disturbance to Contra Costa Goldfield populations identified during rare plant surveys.

To minimize the potential impacts of installing the pipeline several routes were evaluated. These routes consisted of trying to follow existing roads, utilizing existing pipelines, installing the pipe above grade as well as various combinations of the above. After several iterations and reviews it was decided that the route proposed in this document is the superior alternative based on minimization of environmental impacts, economic feasibility and utilization of an existing corridor.

The proposed route will parallel the existing railroad tracks along the southerly side. The pipeline will be installed utilizing conventional trenching methods, slick boring (Jack and Bore methods without the casing) or directional drilling. The conventional trenching methods will be utilized for the majority of the length of the pipeline. Slick bore or directional drilling will be used to avoid surface disturbance in two vernal pool complexes that flow through the railroad right-of-way from north to south, and one vernal pool that contains Contra Costa Goldfields. The existing railroad tracks and railroad ties will be removed to facilitate construction as well as maintain the pipeline in the future. The rail bed will then be utilized as a staging area as well as access route for the pipeline work. The proposed pipeline route, construction methods and preliminary work areas are shown on the attached map.

The section across the Contra Costa Goldfields and vernal pool drainage areas would involve jack and bore methods (Slick Bore) or utilizing directionally drilling. If directional drilling is utilized the top of the pipe for the drill string will be approximately 25 to 35 feet below grade at the center of the drill path. The entry point of the pipe would be located approximately 250 feet westerly of the Goldfields with the exit point of the bore being approximately 200 feet westerly of the vernal pool drainage area as shown in Attachment "A".

The directional drilling contractor would utilize two staging areas for equipment and storage during the directional drilling. The first staging area would be approximately 45

feet by 150 feet on the entry side of the bore (equipment area just for directional drilling operations), and 45 feet by 1500 feet on the exit side to accommodate the portion of the pipe that would be pulled back into the drilled hole as well as equipment. These staging areas would be located along the proposed pipeline route within the existing railroad right-of-way. The construction corridor may need to be adjusted for width along the right-of way to accommodate construction as well as minimize impacts but all work would occur along the southerly side of the raised railbed as well as the existing railbed where the ballast currently exists.

Slick boring would be the primary option to cross the Contra Costa Goldfields and vernal pool drainage areas. Slick boring is similar to utilizing a standard “Jack and Bore” method where a casing(typically two pipe sizes larger than the carrier pipe) is jacked into place then the carrier pipe installed within the casing. The slick bore option installs a sacrificial pipe utilizing the jack and bore methods discussed above that is the same size as the carrier pipe then the carrier pipe is pushed(jacked) in behind the sacrificial pipe until the final carrier pipe is in place. This jack and bore method uses a series of augers to carry the cut materials through the bored hole and the pipe is utilized to stabilize the hole. Typically no drilling fluids are used during this process. The advantage to utilizing a slick bore over a conventional jack and bore with casing is that the carrier pipe can be cathodically protected when the slick bore option is used.

A secondary option to cross the Contra Costa Goldfields and vernal pool drainage areas would be directional drilling. The drilling operation consists of clearing and grubbing the work areas to provide a clear working area for the drilling equipment. Sediment controls would be set up during clearing and grubbing to contain sediment and drilling mud onsite. A temporary 10-foot by 10-foot sump pit approximately 5 feet deep would be excavated near the entry point of the drill site to contain the drilling mud. Once the drilling contractor is setup a hole would be horizontally drilled under the Contra Costa Goldfield and vernal pool area to the east. The final diameter of the directionally drilled hole would be approximately 24 to 32 inches in diameter depending on the soil type. When the directional drilling process is complete the 16-inch pipe would be attached to the drilling string at the exit hole, and pulled back through the hole. During construction, drilling mud would be removed from the pit and transferred to a mud-cleaning unit where the drilled solids are settled out. The drilled solids would be pumped into a tank or vacuum truck and disposed of per governing regulations. The cleaned drilling mud would then be recycled, hauled off site to be used at another drilling location, or disposed of with the drilling solids.

In the event of a fracture (Frac-Out) during the drilling operations all drilling operations would be shutdown. Containment equipment would be staged at the site during the drilling operations to minimize any impacts to the environment. Equipment would consist of vacuum unit(s) with at least 150 feet of hose, spill containment boom, half drums, absorbent pads, culvert pipe, sand bags and misc. hand tools. This equipment would be staged along the bore path on the railroad bed. Once the frac-out has been contained, a determination would be made as to potential for impact to sensitive species or habitats. If

there was potential for impact, the appropriate regulatory agencies would be contacted to coordinate additional impact assessment and potential mitigation. Measures would be instituted to reduce the threat of further frac-out, and drilling would begin again. To minimize the chance of a frac-out, drilling/mud pressures would be monitored down hole, bore path design would incorporate maximum entry and exit angles as well as depth to minimize the chance of a frac out and would utilize best management practices during the drilling process to reduce the risk of a frac-out. Please refer to Attachment “B” for additional information on directional drilling operations.

The conventional pipe line installation of this project would consist of utilizing rubber tired backhoe’s, grader’s, excavators, side boom tractors as well as potentially a trenching machine to excavate and install the pipeline. Trench material would be stockpiled along the ditchline or loaded into trucks, The material would be transported along the work area to the proposed terminal area, stockpiled then returned to the ditchline once the pipe has been installed in the trench. Depending on the work area and methods of installation, the equipment may need to work off of the top of the stockpile to install the pipe. Typically there would be at least 1500 feet of trench opened up with pipe welded up along side of the trench. The trenching crew, welding crew, coating crew and backfilling crew would all be moving in one direction along the pipeline route in which the pipeline would be installed in a continuous fashion from one end to the other. If portions such as the directional drill or slick bore portions were not completed yet, the crews would just move forward to the next location and continue along the alignment. Once the areas that were skipped were ready to be tied into, a crew would drop back to install that portion of the pipeline.

The pipe would be installed at least 42 inches below existing grade and where it crosses drainage ditches the depth would be increased to 60 inches below the flow line. During a normal installation, the pipe would be set next to the trench using a hydrocrane and welded into a continuous section. The welds would be wrapped or coated to prevent corrosion. After welding and coating of the pipe sections the new pipe would be lowered into the trench, tied into the drilled/bored sections of the pipeline , backfilled and hydrostatically tested. The hydrotest would consist of filling the new section of line with clean water, pressurizing the section to a minimum of 1850 psig and holding it for 8 hours. Once the test is complete the water would be pushed out of the line and the system dried.

To protect water quality during construction the following Best Management Practices would be used as needed:

a.) Pipeline construction will be limited to the dry season only (April 16 through October 14).
b.) During trench excavation, the top 9-inches of soil will be excavated and stored separately. The top 9-inches of soil will be replaced upon completion of backfill and compaction and returned to pre-construction contours to limit changes in surface hydrology.

c.) Silt fencing, straw wattles and straw bales would be utilized to intercept, slow and retain water/sediment in storm water runoff. These protection measures would be utilized in areas of slopes greater than 2:1 or where runoff from the disturbed area would impact local creeks, channels or environmentally sensitive areas. These measures would only be used in areas where area has not been revegetated or returned to its previous state prior to the “wet” season.

d.) Disturbed areas will be temporarily stabilized using accepted methods for soil stabilization including coconut coir matting or tackified hydroseeding compounds. Areas will be re-vegetated to provide permanent erosion control.

e.) All concrete cuttings would be collected and disposed of per governing regulations. Shovel or vacuum saw-cut slurry deposits and remove from the site.

f.) Clean water will be used for dust suppression. The minimal amount necessary will be used, however, to avoid excessive runoff.

g.) Employees would be trained on BMP’s, storm water discharge prohibitions and waste discharge requirements.

h.) Drip pans or absorbent material shall be utilized to catch drips from equipment while parked. Any equipment that is leaking fluid shall be fixed immediately or removed from the jobsite.

i.) Sweep or vacuum the pouring and cutting areas regularly to collect loose materials.

j.) Clean up all spills and leaks using “dry” methods (with absorbent materials/rags), or dig up and remove contaminated soil.

k.) Cover stockpiles and other construction materials with plastic tarps when material would sit for more than seven days. Protect from rainfall and prevent runoff with temporary plastic sheets and berms.

l.) After breaking up old pavement/concrete, be sure to remove all chunks and pieces from the site or place in area that would prevent material from being spread out.

m.) If flowing or standing water is encountered in any of the areas a temporary dike would be established upstream from the work area to create a ponding area. In the event that the water is flowing a temporary culvert across the work area would be installed to allow the water to continue downstream yet leave the work area dry.

n.) If the trench is required to be dewatered all water would be directed to upland areas, filtered through silt bags and allowed to percolate through the ground surface. Construction water would not be discharge directly to any surface water. If a direct discharge to surface water is required a NPDES permit would be applied for.

o.) It is unlikely that a frac-out would occur based on preventative measures implemented during the design phase of the project (entry/exit angles, depth of cover,e tc.) as well as monitoring of mud pressures, mud returns and force exerted on the drill string. However, in the event that directional drilling fluid is spilled or it fractures the surface, the drilling fluid will be contained utilizing earthen berms, sandbags, temporary diversion boom or other methods to minimize impacts. A

vacuum truck or trailer will also be available during drilling operations to vacuum up any spilled drilling fluids. A site specific formal fracture plan will be prepared prior to the drilling operations being utilized.

Upon completion of repairs, the right of way would be restored. For sensitive environments including wetlands, endangered species habitat, and woodlands site restoration efforts would be conducted and monitored in accordance with the approved plans and permit conditions.

5 SYSTEM DESIGN

Kinder Morgan proposes to install 16-inch diameter, API-5L-X52 pipe that has a wall thickness of 0.375 inches. A thicker wall pipe may be used for the directional drill or bored portions depending on final design of the bore path(s). For corrosion protection the pipe would be coated with fusion bonded epoxy or other coating capable of handling the proposed installation methods to maintain its integrity. The pipeline would also be cathodically protected utilizing an impressed current system. The pipe would have maximum operating pressure of 1440 psig and is operated at ambient temperature.. This new section of line would meet the codes, specifications, and requirements set forth by federal, state, and county regulatory agencies governing the operation of petroleum pipelines, including ANSI B31.4, ASTM Standard, and 49 CFR 195. Welding would conform to the latest edition of the API STD 1104 "Standard for Welding Pipelines and Related Facilities."

6 CONSTRUCTION CORRIDOR

The pipeline construction corridor would consist of the area from the north side of the railroad bed to the southerly fence-line along the proposed right-of-way. The majority of this area is approximately 45 feet in width. At the easterly end of the project where the right-of-way is less likely to disturb environmentally sensitive areas the width would be increased to 75 feet to accommodate the construction equipment, pipe storage as well as the excavated soil. Where jack and bore or directional drilling operations are required the “Rig Side” (area where the drilling equipment would be located) work space would require an area of 45-ft. wide by 150-ft. long with the use of the rail bed as an additional work space just for the boring operations. Once the boring operations are complete then the pipeline would be tied into these locations. The “Pipe Side”(area where the pipe is fabricated to be pulled into the directionally drilled hole and support equipment for the drilling operation) work space would require the same amount of area for the drilling operations plus a laydown area for the pipeline. The pipe laydown area should be at least the length of the drill string so that the pipe can be fabricated into one continuos string and hydrostatically tested prior to pulling into the bored hole. A 100’ by 250’ staging area westerly of Walters Road within the railroad right-of-way would potentially be used as a storage/staging area during construction of the pipeline and pipeline facilities.

Activity in the construction corridor consists of clearing and grubbing, drilling, excava-

tion, hauling and setting pipe, welding, and backfilling. Once all of the construction activities are completed the site would be restored to natural grade and revegetated to pre-construction conditions within one year of construction completion.

In addition to the pipeline corridor a portion of the terminal laydown/equipment area would be needed to store pipe, construction equipment, dirt and misc, items due to the narrow width of the pipeline corridor. This area would also be restored to pre-construction conditions once the pipeline has been completed unless it has been designated for other uses for the terminal.

6.1 Road Crossings

The pipeline route does not cross any public roads. Access to the pipeline route would be from Walters Road as well as from the Travis Air Force Base road system. The existing farm roads that cross the existing area would be temporarily blocked off during the pipeline installation then restored to their previous state once the pipeline has been installed. The pipeline installation work would be coordinated with the adjacent landowners/ranchers to minimize disruption to there operations. If any culverts are exposed during crossing of any of the roads they would be worked around or replaced as needed to install the pipeline.

6.2 Project Inspection

The pipeline contractor(s) and Kinder Morgan personnel would complete the work according to the Kinder Morgan plans and project specifications. Kinder Morgan Contract Inspectors would be present to enforce the plans and project specifications.

6.3 Welding Specifications

The Pipeline would be welded in compliance with API Standard 1104 "Standard for Welding Pipelines and Related Facilities". All welds would be radiographically inspected and all welders would be tested per API 1104.

6.4 Construction Equipment

The pipeline relocation would likely require the following equipment. The actual equipment used would depend on the contractor(s) and work crews:

- One to two backhoes/excavators,
- One drill rig, temporary storage tanks, and support equipment
- Two or three sidebooms,
- Crane(s) for support of pipe during pull back
- One or two loaders
- Support equipment for the welders, surveyors, construction crews, x-ray technician, and a Kinder Morgan inspector.

Construction equipment would be trucked to the site via existing county, city and state roads. The existing rail bed would also be utilized to access the pipeline route.

6.5 Project Schedule

Construction operations, including tank farm and pipeline segments, is currently scheduled to begin in late 2009 or early 2010 depending on final project approval. Once a contractor is identified and materials are received, construction is estimated to take approximately 18 to 22 months with the pipeline portion taking approximately 3 to 4 months to install. The pipeline will be installed during the dry season (April 16 through October 14) to avoid potential ponding of water as well as minimize impacts to the surrounding area.

6.6 Pipeline Installation/ Conceptual Plan

The following describes the likely sequence of events for the relocation project:

1. Project permitting and regulatory approval
2. Prepare project specifications and drawings. Conduct hazard analysis per Company Policy
3. Order required materials and fittings.
4. Identify contractor that is qualified to complete the work and prepare project timeline and resources needed.
5. Mobilization of construction equipment and materials for project.
6. Have survey crews layout the construction corridor limits, pipeline alignment, entry point, exit point and existing pipeline route.
7. Contractor to clear the right-of-way of debris and prepare pipeline right-of-way.
8. Excavate pipeline trench for conventional pipe installation.
9. Set-up of bore/drill rig and support equipment. Once the rig is set up and all support equipment is in place, begin directionally drilling or boring under the Goldfield/Vernal Pool Area(s). The directional drilling would consist of at least three phases: pilot hole, reaming, and pullback or product installation. (Refer to attachment “A” for additional information)
10. Deliver the pipe, equipment and materials to the project site. Hydro-cranes/Excavators would unload the pipe joints and materials at the pipeline site and spot them along the prepared right-of-way.
11. Weld individual joints into one continuos string and inspected per “API STD. 1104”. Once the welds have passed inspection, the joints should be coated and the directional drill portion of the line would be hydrotested for four hours above grade (optional).

12. When the pipeline string has been successfully hydrotested and dewatered it can be pulled into the drilled hole. In this stage the pipe would need to be jeeped and set on pipe rollers so that the pipe can pull smoothly into the hole. The pipe that is pulled into the hole should be cut off so that top of pipe is at least 48-inches below grade when the prefabricated bends are welded on.
13. Fabricate the tie-in spools to tie the drilled/bored pipe to the other pipe that was installed utilizing conventional methods.
14. Backfill and compact trench per construction specifications and drawings.
15. Hydrotest entire assembly for 8-hours per State Fire Marshall requirements.
16. Drain hydrotest water and dry new line with foam pigs using compressed air.
17. Schedule tie-in to the existing 20-inch pipeline per operations schedule.
18. Drain/purge existing 20-inch line into temporary or permanent tankage per Kinder Morgan procedures. A formal tie-in and drain down plan would be prepared prior to work taking place.
19. Tie-in new section of 20-inch line and fill through header system to downstream isolation point and bleed all air from the existing 20-inch system.
20. Coat remaining weld joints.
21. Surveyors would locate the final horizontal and vertical position before backfilling the trench. Kinder Morgan's engineering consultant would prepare record drawings for the entire project based on as-built information.
22. The entire right-of-way route would be returned to its natural contour and grade. Restoration may include hydroseeding, repair of property damage and other mitigating measures agreed to before construction.

7. PHOTO'S ALONG PROJECT SITE

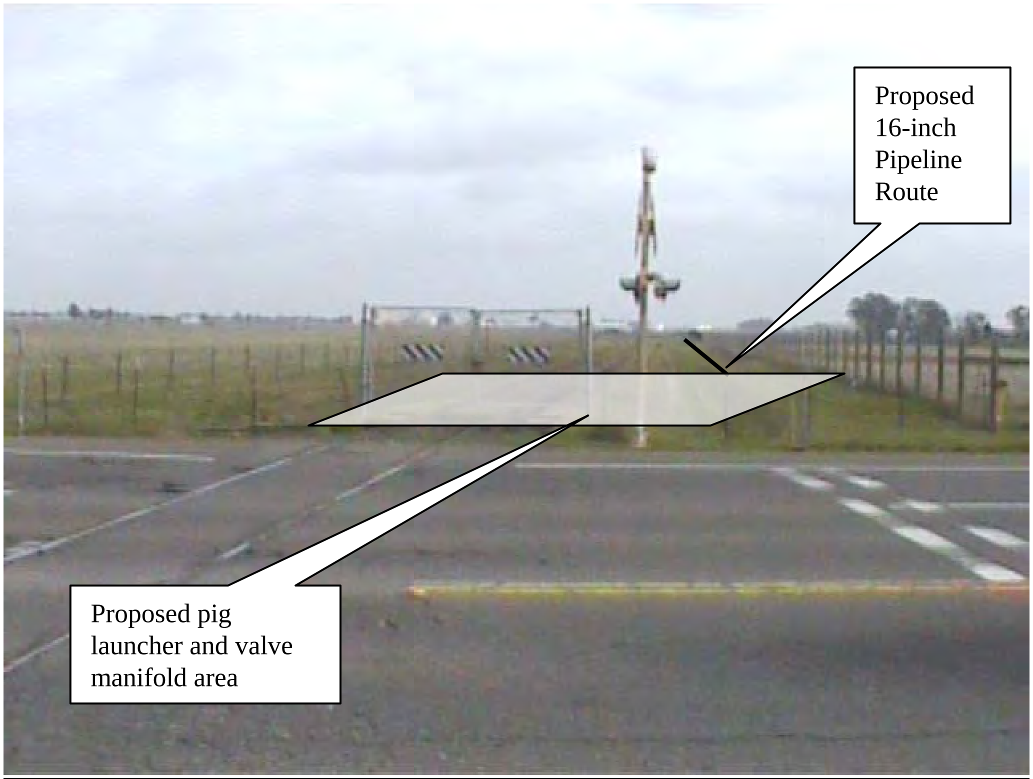


Photo 1 – Walters Road Looking Easterly

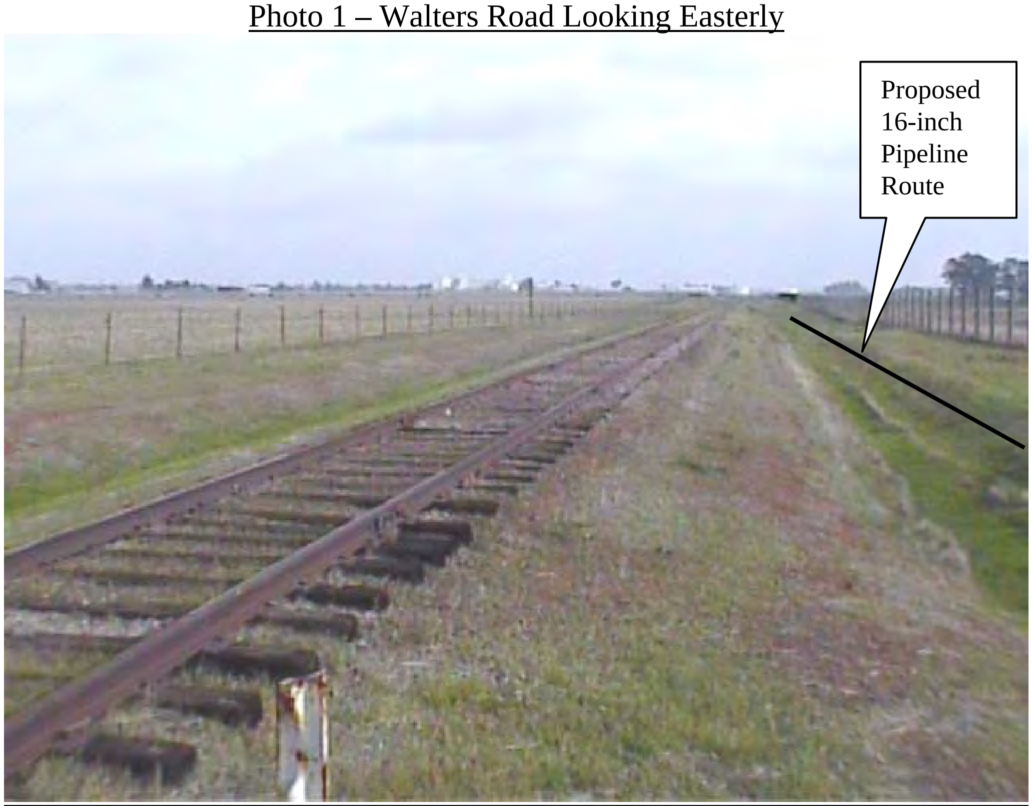
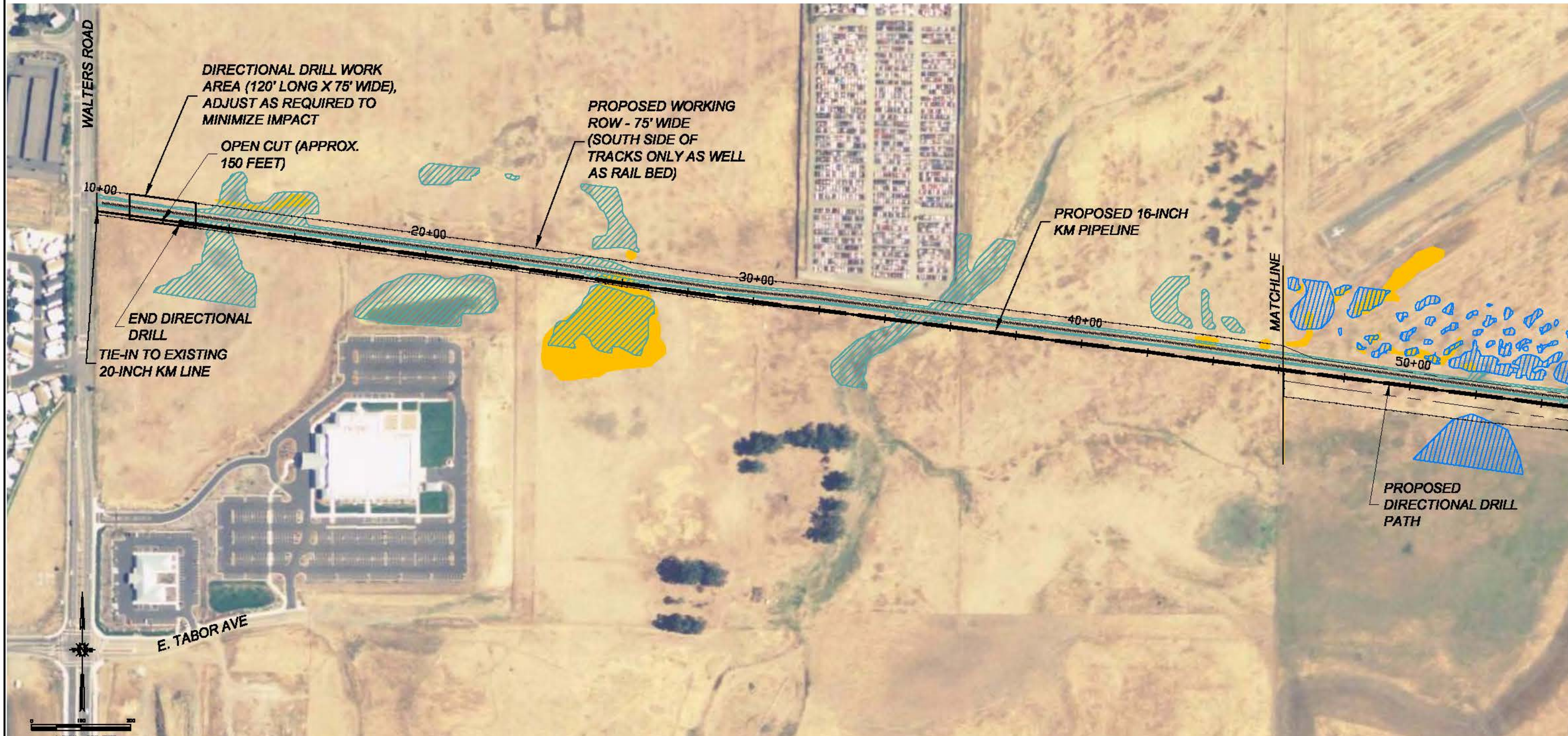


Photo 2 – Looking Easterly Along Proposed Pipeline Route

ATTACHMENT "A"

CONCEPTUAL PLAN DRAWINGS



LEGEND

- CONTRA COSTA GOLDFIELDS - NO DISTURBANCE ALLOWED
- VERNAL POOL (AMEC 2008)
- VERNAL POOL (TAFB GIS)
- PROPOSED 16-INCH PIPELINE
- PROPOSED 75' WORKING AREA
- PROPOSED DIRECTIONAL DRILL

NOTES:

- AERIAL PHOTO - 2005
- THIS DRAWING IS FOR GRAPHICAL REPRESENTATION ONLY, DO NOT SCALE OR UTILIZE FOR CONSTRUCTION PURPOSES.

BRINDERSON

Cannon ASSOCIATES

REV.	DATE	REVISED	DESTROY ALL PRINTS BEARING EARLIER DATE	REV. BY	CKD. BY	APP'D
1	05/26/09	DIRECTIONAL DRILL OPTION		CAD	CAD	AE

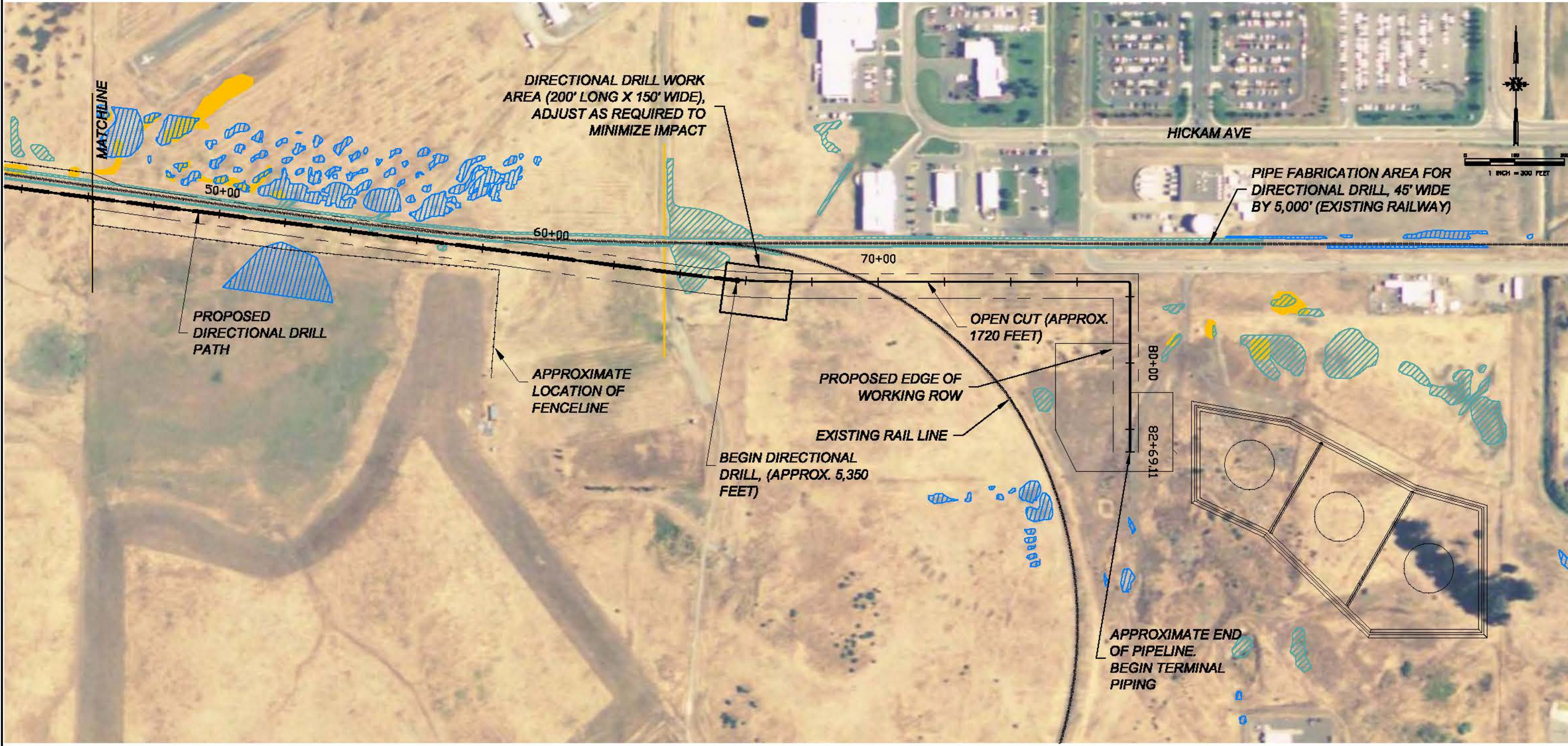
DRAWN BY CAD
CHECKED BY CAD
SCALE AS NOTED
DATE 05/26/09

EXHIBIT MAP – TRAVIS AFB
PIPELINE PROJECT DESCRIPTION
SOLANO COUNTY, CA

KINDER MORGAN

DRAWING NUMBER ME8613EX004–DD

SHEETS 2 SHEET 1



LEGEND

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BRINDERSON

Cannon ASSOCIATES

REV.	DATE	REVISED	DESTROY ALL PRINTS BEARING EARLIER DATE	REV. BY	CKD. BY	APP'D
1	05/26/09	DIRECTIONAL DRILL OPTION		CAD	CAD	AE

DRAWN BY CAD
CHECKED BY CAD
SCALE AS NOTED
DATE 05/26/09

EXHIBIT MAP – TRAVIS AFB
PIPELINE PROJECT DESCRIPTION
SOLANO COUNTY, CA

KINDER MORGAN

DRAWING NUMBER ME8613EX004–DD

SHEETS 2 SHEET 2

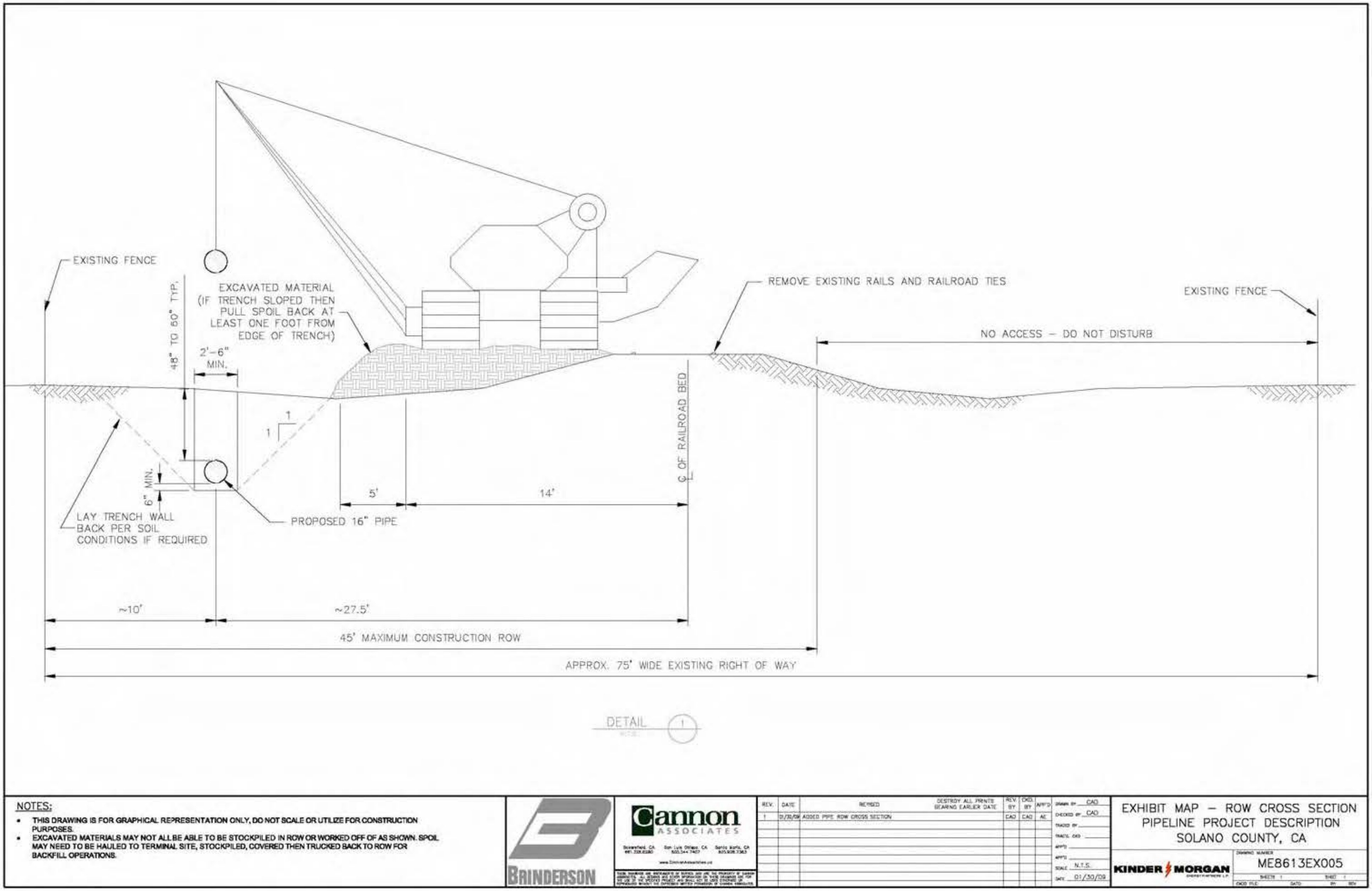
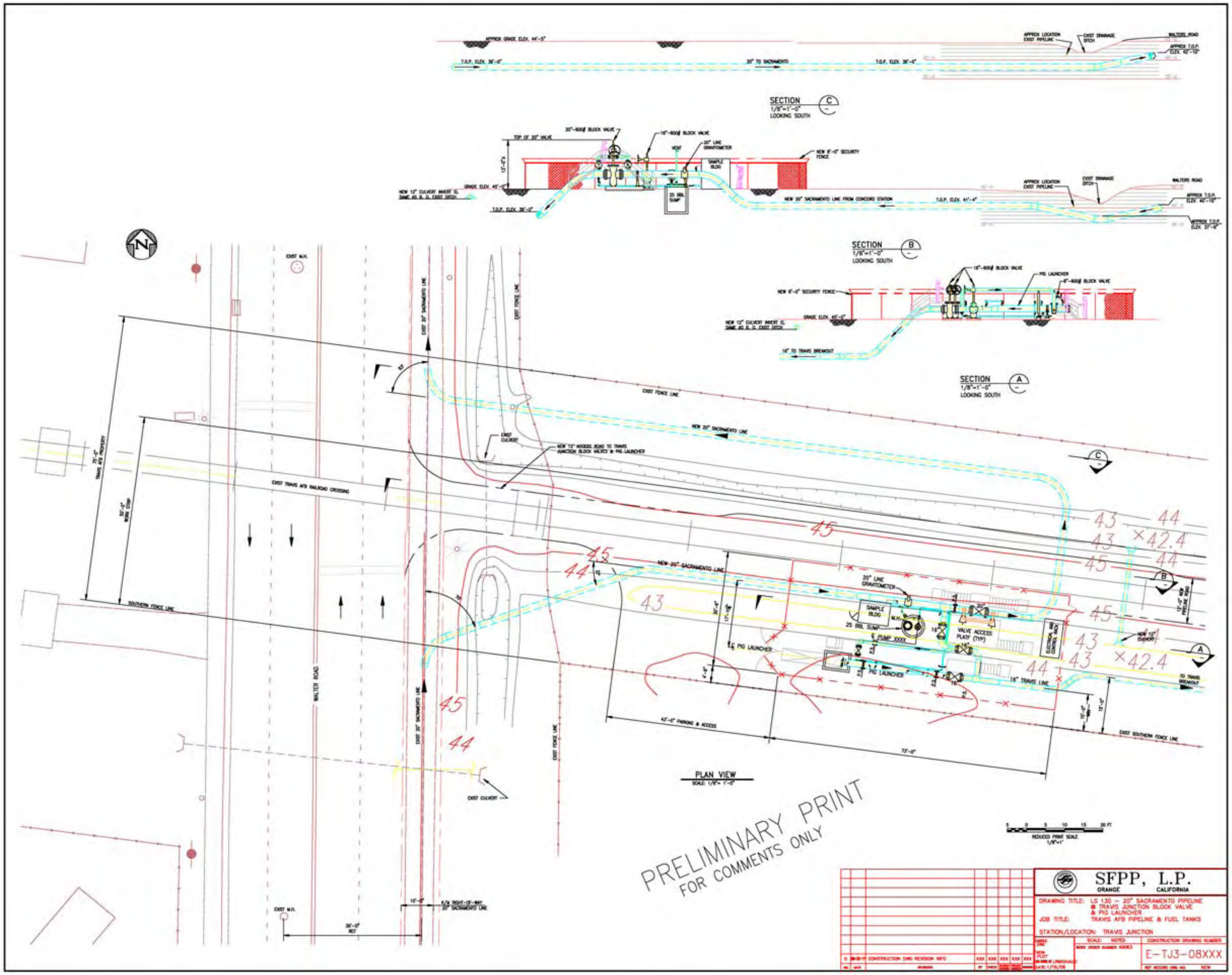
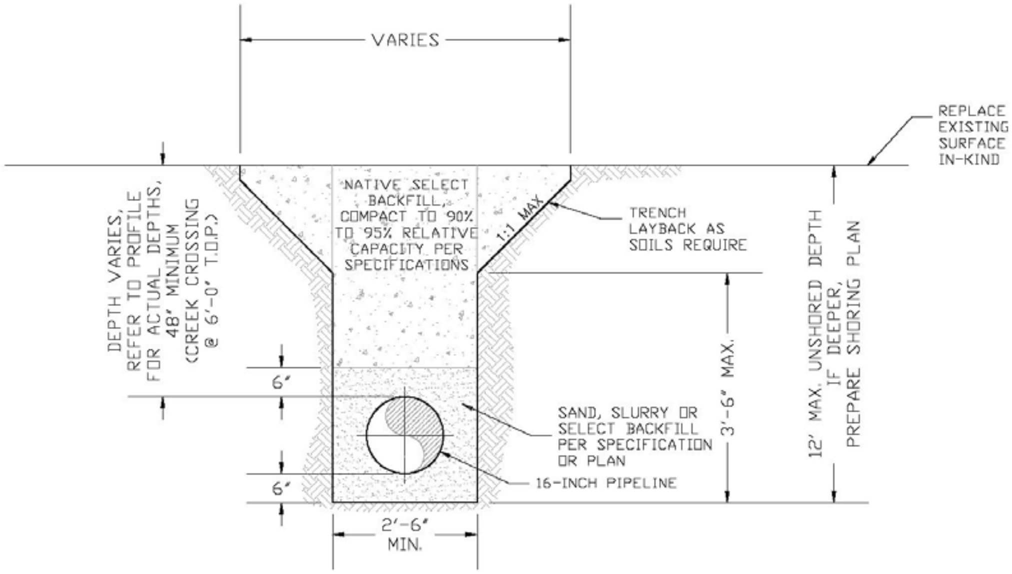


Exhibit Map – Proposed ROW Cross Section



Preliminary Facility Layout Drawing - Launcher



TRENCH CROSS SECTION DETAIL

REFERENCE: OUTSIDE OF VERNAL POOL DRAINAGE CROSSINGS
SCALE: NONE

Proposed Trench Detail Cross Section Along Pipeline Route

ATTACHMENT "B"

GUIDELINES FOR A SUCCESSFUL DIRECTIONAL CROSSING

Written by DCCA

Guidelines For A Successful Directional Crossing Bid Package

The Directional Crossing Contractors Association (DCCA) has been addressing the issue of what information should be made available to contractors and engineers so that future projects proceed as planned. Crossings of rivers and other obstacles using directional drilling techniques are increasingly being utilized around the world. As in any construction project, it is necessary for the contractor to have as much information as possible to prepare a competitive and comprehensive proposal and to be able to successfully install the crossing. Better pre-construction information also allows the work to be undertaken more safely and with less environmental disturbance.

I. OVERVIEW

A. DEVELOPMENT AND USES - Originally used in the 1970s, directional crossings are a marriage of conventional road boring and directional drilling of oil wells. The method is now the preferred method of construction. Crossings have been installed for pipelines carrying oil, natural gas, petrochemicals, water, sewerage and other products. Ducts have been installed to carry electric and fiber optic cables. Besides crossing under rivers and waterways, installations have been made crossing under highways, railroads, airport runways, shore approaches, islands, areas congested with buildings, pipeline corridors and future water channels.

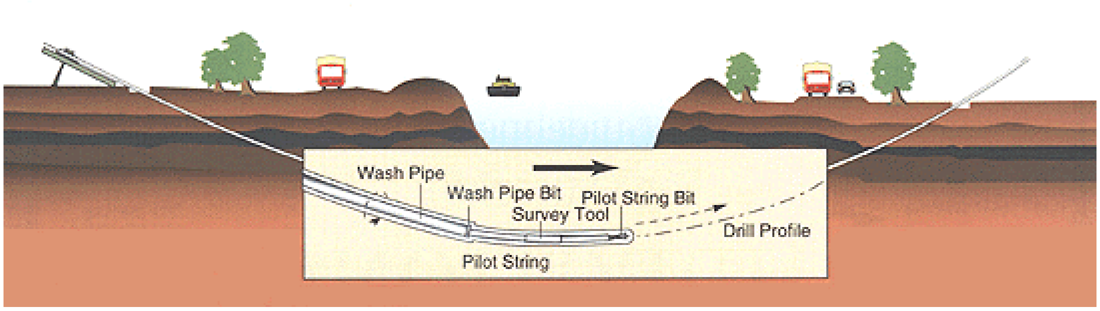
B. TECHNOLOGY LIMITS -The longest crossing to date has been about 6,000 ft. Pipe diameters of up to 48 in. have been installed. Although directional drilling was originally used primarily in the U.S. Gulf Coast through alluvial soils, more and more crossings are being undertaken through gravel, cobble, glacial till and hard rock.

C. ADVANTAGES - Directional crossings have the least environmental impact of any alternate method. The technology also offers maximum depth of cover under the obstacle thereby, affording maximum protection and minimizing maintenance costs. River traffic is not interrupted, as most of the work is confined to either bank. Directional crossings have a predictable and short construction schedule. Perhaps most significant, directional crossings are in many cases less expensive than other methods.

D. TECHNIQUE

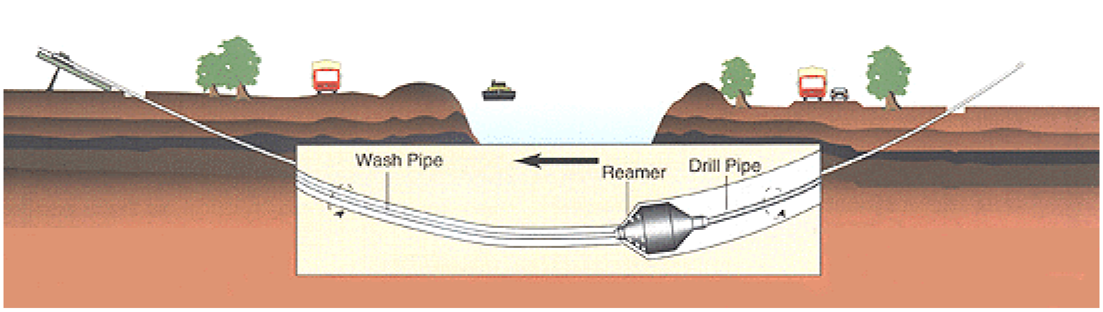
1. Pilot Hole - A pilot hole is drilled beginning at a prescribed angle from horizontal and continues under and across the obstacle along a design profile made up of straight tangents and long radius arcs. A schematic of the technique is shown in Figure 1. Concurrent to drilling pilot hole, the contractor may elect to run a larger diameter "wash pipe" that will encase the pilot drill string. The wash pipe acts as a conductor casing providing rigidity to the smaller diameter pilot drill string and will also save the drilled hole should it be necessary to retract the pilot string for bit changes. The directional control is brought about by a small bend in the drill string just behind the cutting head. The pilot drill string is not rotated except to orient the bend. If the bend is oriented to the right, the drill path then proceeds in a smooth radius bend to the right. The drill path is monitored by an electronic package housed in the pilot drill string near the cutting head. The electronic package detects the relation of the drill string to the earth's magnetic field and its inclination. This data is transmitted back to the surface where calculations are made as to the location of the cutting head. Surface location of the drill head also can be used where there is reasonable access.

I.D.1. Pilot Hole



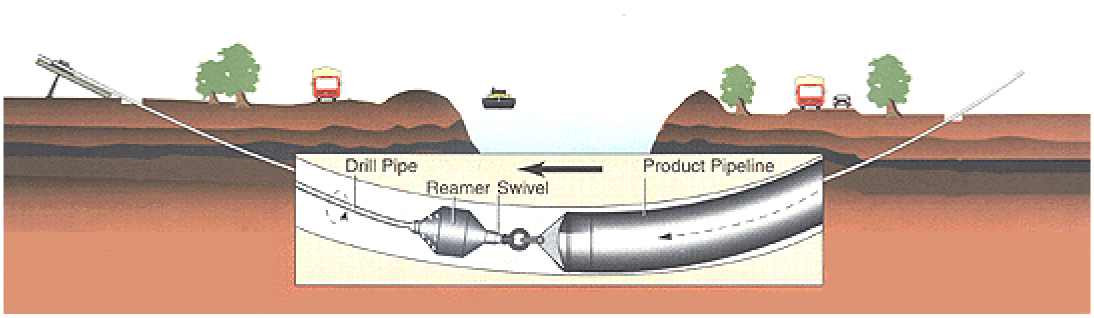
2. Preream - Once the pilot hole is complete, the hole must be enlarged to a suitable diameter for the product pipeline. For instance, if the pipeline to be installed is 36 in. diameter, the hole may be enlarged to 48 in. diameter or larger. This is accomplished by "prereaming" the hole to successively larger diameters. Generally, the reamer is attached to the drill string on the bank opposite the drilling rig and pulled back into the pilot hole. Joints of drill pipe are added as the reamer makes its way back to the drilling rig. Large quantities of slurry are pumped into the hole to maintain the integrity of the hole and to flush out cuttings.

I.D.2. Preream



3. Pullback - Once the drilled hole is enlarged, the product pipeline can be pulled through it. The pipeline is prefabricated on the bank opposite the drilling rig. A reamer is attached to the drill string, and then connected to the pipeline pullhead via a swivel. The swivel prevents any translation of the reamer's rotation into the pipeline string allowing for a smooth pull into the drilled hole. The drilling rig then begins the pullback operation, rotating and pulling on the drill string and once again circulating high volumes of drilling slurry. The pullback continues until the reamer and pipeline break ground at the drilling rig.

I.D.3. Pullback



II. LAYOUT AND DESIGN

A. ACCESS - Heavy equipment is required on both sides of the crossing. To minimize cost, access to either side of the crossing should be provided with the least distance from an improved road.

Often the pipeline right-of-way is used for access. All access agreements should be provided by the owner. It is not practical to negotiate such agreements during the bid process.

B. WORK SPACE

1. Rig Side -The rig spread requires a minimum 100-ft. wide by 150-ft. long area. This area should extend from the entry point away from the crossing, although the entry point should be at least 10 ft inside the prescribed area. Since many components of the rig spread have no predetermined position, the rig site can be made up of smaller irregular areas. Operations are facilitated if the area is level, hardstanding and clear of overhead obstructions. The drilling operation requires large volumes of water for the mixing of the drilling slurry. A nearby source of water is necessary (Figure 2).

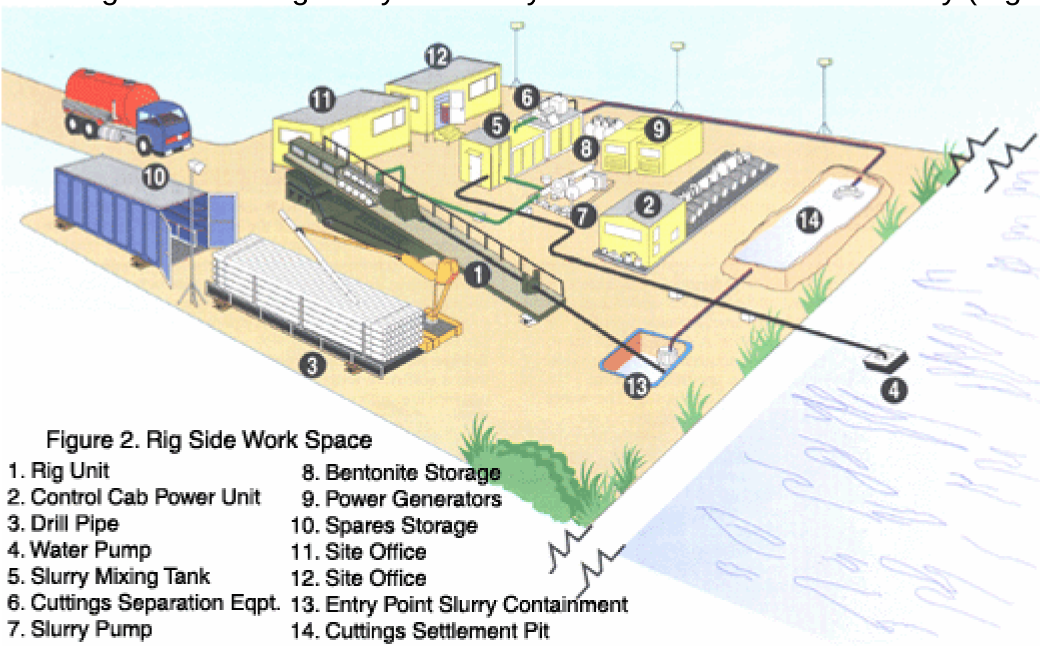


Figure 2. Rig Side Work Space

1. Rig Unit
2. Control Cab Power Unit
3. Drill Pipe
4. Water Pump
5. Slurry Mixing Tank
6. Cuttings Separation Eqpt.
7. Slurry Pump
8. Bentonite Storage
9. Power Generators
10. Spares Storage
11. Site Office
12. Site Office
13. Entry Point Slurry Containment
14. Cuttings Settlement Pit

2. Pipe Side - Strong consideration should be given to provide a sufficient length of work space to fabricate the product pipeline into one string. The width will be as necessary for normal pipeline construction although a work space of 100-ft. wide by 150-ft. long should be provided at the exit point itself. The length will assure that during the pullback the pipe can be installed in one uninterrupted operation. Tie-ins of successive strings during the pullback operation increase the risk considerably because the pullback should be continuous (Figure 3).

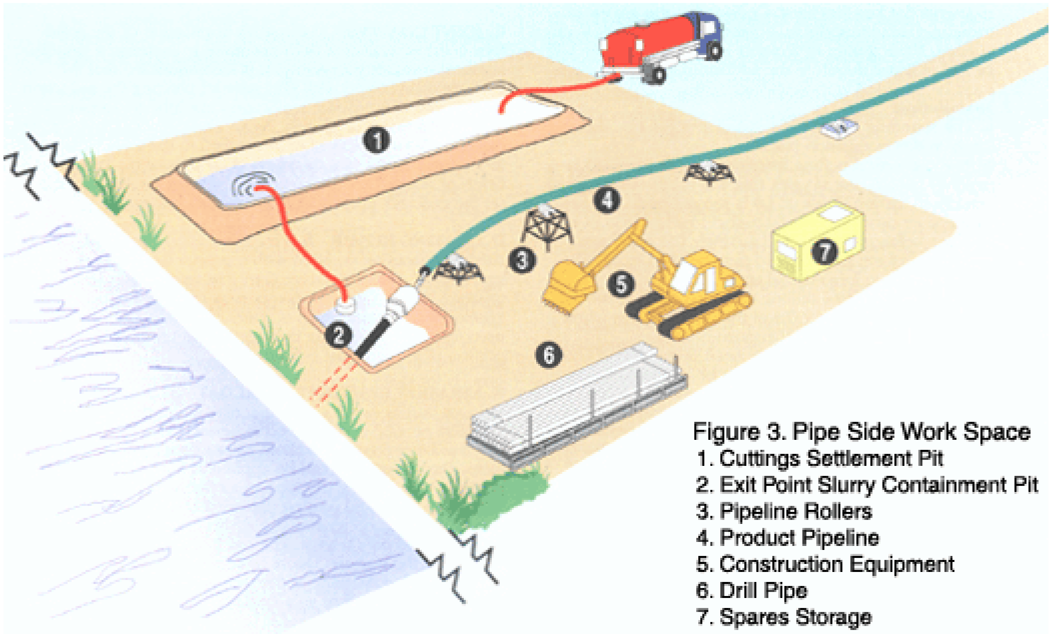


Figure 3. Pipe Side Work Space
1. Cuttings Settlement Pit
2. Exit Point Slurry Containment Pit
3. Pipeline Rollers
4. Product Pipeline
5. Construction Equipment
6. Drill Pipe
7. Spares Storage

C. PROFILE SURVEY - Once the work locations have been chosen, the area should be surveyed and detailed drawings prepared. The eventual accuracy of the drill profile and alignment is dependent on the accuracy of the survey information.

D. PROFILE DESIGN PARAMETERS
1. Depth of Cover -Once the crossing profile has been taken and the geotechnical investigation complete, a determination of the depth of cover under the crossing is made. Factors considered may include flow characteristics of the river, the depth of scour from periodic flooding, future channel widening/deepening, and the existence of existing pipeline or cable crossings at the location. It is normally recommended that the minimum depth of cover be 20 ft. under the lowest section of the crossing. While 20 ft. is a recommended depth of cover on a river crossing, crossings of other obstacles may have differing requirements.

2. Penetration Angles and Radius of Curvature - An entry angle between 8 and 20 can be used for most crossings. It is preferable that straight tangent sections are drilled before the introduction of a long radius curve. The radius of the curve is determined by the bending characteristic of the product pipeline, increasing with the diameter. A general "rule-of-thumb" for the radius of curvature is 100 ft./1-in. diameter for steel line pipe. The curve usually brings the profile to the elevation providing the design cover of the pipeline under the river. Long horizontal runs can be made at this elevation before curving up towards the exit point. Exit angle should be kept between 5 and 12 to facilitate handling of the product pipeline during pullback.

E. DRILL SURVEY - Most downhole survey tools are electronic devices that give a magnetic azimuth (for "right/left" control) and inclination (for "up/down" control). Surface locators can also be used in conjunction with the downhole electronic package.

1. Accuracy - The accuracy of the drill profile is largely dependent on variations in the earth's magnetic field. For instance, large steel structures (bridges, pilings, other pipelines, etc.) and electric power transmission lines affect magnetic field readings. However, a reasonable drill target at the pilot hole exit location is 10 ft. left or right, and -10 ft. to +30 ft. in length.

2. As-Built Drawings - Normally, survey calculations are conducted every 30 ft. during pilot hole operations. As-built drawings that are based on these calculations should be provided by the contractor. Alternate methods such as gyroscoping, ground penetrating radar or "intelligent" pigs may also be used to determine the as-built position.

III. GEOTECHNICAL INVESTIGATION

A. NUMBER OF BORINGS - The number of exploration holes is a function of the proposed crossing length and the complexity of the strata. If the crossing is about 1,000 ft. a bore hole made on each side of the crossing may suffice. If an examination of these borings indicates that conditions are likely to be homogeneous on both sides, it may not be necessary to conduct further sampling. If the report indicates anomalies discontinuity in the strata, the presence of rock or large concentrations of gravel it is advisable to make additional borings to better define the strata. Longer crossings (especially large diameter pipelines) that indicate gravel, cobble, boulders or rock should have samples taken about 600-800 ft. apart unless significant anomalies are identified that might necessitate more borings. All borings should be located on the crossing profile along with their surface elevations being properly identified. If possible the borings should be conducted at least 25 ft. off of the proposed centerline. The bore holes should be grouted upon completion. This will help prevent the loss of drilling slurry during the crossing installation.

B. DEPTH OF BORINGS - All borings should be made to a minimum depth of 40 ft. below the lowest point in the crossing or 20 ft. below the proposed depth of the crossing, whichever is greater. In some instances, it may be beneficial to the owner and the contractor to install the crossing at a greater depth than the owner requires for his permit. It is suggested that all borings be through the same elevation to better determine the consistency of the underlying material and note any patterns which may be present.

C. STANDARD CLASSIFICATION OF SOILS - A qualified technician or geologist should classify the material in accordance with the Unified Soil Classification System and ASTM Designations D-2487 and D-2488. It is beneficial to have a copy of the field drilling log completed by the field technician or driller. These logs include visual classifications of materials as well as the driller's interpretation of the subsurface conditions between samples.

D. STANDARD PENETRATION TEST (SPT) - In order to better define the density of granular materials the geotechnical engineer generally uses the Standard Penetration Test (SPT), in general accordance with ASTM Specifications D-1586. This is a field test that involves driving a 2-in. split spoon sampler into the soil by dropping a hammer of a specific weight (usually 140 lb) a specified distance (usually 30 in.) to determine the number of blows necessary to drive the sampler 12 in. In very dense soils, the field technician may note the number of blows required to drive the sampler less than the required 12 in. (i.e., 50 blows for 3 in.). The number obtained is the standard penetration resistance value (N) and is used to estimate the in situ relative density of cohesionless soils. Some geotechnical firms will conduct these penetration tests in cohesive materials and rock, and to a lesser extent, the consistency of cohesive soils and the hardness of rock can be determined.

E. THINWALLED "SHELBY" TUBE SAMPLING - Most geotechnical firms prefer to use a Thinwalled Tube Sampling method for obtaining samples of cohesive materials. These tests are conducted in general accordance with ASTM Specification D-1587. This test is similar to the Standard Penetration test except the sample is collected by hydraulically pushing a thin-walled seamless steel tube with a

sharp cutting edge into the ground. The hydraulic pressure required to collect the sample is noted on the field log. This produces a relatively undisturbed sample that can be further analyzed in the laboratory. These samples can be field tested with handheld penetrometers, but more accurate readings of density and consistency can be obtained by performing unconfined compressive strength tests where the results are noted in tons per square foot. Generally, for directional drilling contractors a standard penetration test using the split spoon sampler described above will suffice in both materials.

F. SIEVE ANALYSIS OF GRANULAR MATERIALS - A sieve analysis is a mechanical test of granular materials performed on samples collected in the field during the standard penetration test with the split spoon sampler. The split spoon samples are taken to the laboratory and processed through a series of screens. The sample provides a percentage analysis of the granular material by size and weight. It is one of the most important tests undertaken.

G. ROCK INFORMATION - If rock is encountered during the soils investigation borings, it is important to determine the type, the relative hardness and the unconfined compressive strength. This information is typically collected by the geotechnical drilling firm by core drilling with a diamond bit core barrel. The typical core sample recovered with this process has a 2-in. diameter. The type of rock is classified by a geologist. The geologist should provide the Rock Quality Designation (RQD) which rates the quality of the rock based on the length of core retrieved in relation to the total length of the core. The hardness of the rock Mohs' Scale of Hardness) is determined by comparing the rock to ten materials of known hardness. The compressive strength is determined by accurately measuring the core and then compressing the core to failure. This information pertaining to the underlying rock formation is imperative to determine the type of downhole equipment required and the penetration rates that can be expected.

IV. PIPE MATERIAL SELECTION

A. WALL THICKNESS -D/T "RULE OF THUMB" - The following table provides generalized recommendations for the selection of steel pipe wall thicknesses relative to pipe diameter. These recommendations are meant to be used only as a starting point in the design. It is recommended that in the final design, specific stresses be calculated and compared with allowable limits.

Diameter (D)	Wall Thickness (t)
6 in. and smaller	0.250 in.
6 to 12 in.	0.375 in.
12 to 30 in.	0.500 in.

For 30 in and larger, $D/t \leq 50$

(For high-density polyethylene (HDPE) pipe, a standard dimension ratio of D/t, SDR, of 11 or less is recommended and the pipe manufacturer should be consulted).

B. STRESS ANALYSIS - In finalizing the design, the stresses imposed during construction and in-service must be calculated and checked to be within allowable limits for the grade of material. The stresses at each stage must be considered acting individually and in combination. Stresses result due to spanning between rollers prior to pullback, the hydrostatic testing pressures, pulling forces during installation, radius of curvature as the pipe enters the ground, the drilling profile curvature, external pressures in the drilled hole, and the working pressure.

1. Pre-installation

a. Hoop and longitudinal stresses resulting from hydrostatic testing are calculated.

b. Using the known distance between rollers as the free spanning distance, the maximum hogging and sagging moments can be calculated. Considering the greater of these two moments, the maximum spanning stress is calculated. Note: during hydrostatic testing the pipeline will be full of water therefore the additional weight of water must be included in these calculations.

2. Installation

a. The spanning stresses calculated in stage 1.b. also apply in this installation phase.

b. The theoretical pulling force must be determined in order to provide the stresses that will result. An assumed downhole friction factor of 1.0 is recommended to provide conservative results and to include the effect of the pipeline being pulled around a curve. The maximum predicted pulling force should then be used in calculating the resulting longitudinal stress.

c. Allowing for a 10% drilling tolerance, leads to the use of a radius of curvature 90% of the design radius when calculating the longitudinal curvature stresses.

d. External pressure from static head in the drilled hole and/or overburden pressures must be considered. It is recommended that the static head resulting from the maximum envisaged drilling fluid density should be used with a factor of safety of 1.5 to provide conservative estimations of resulting hoop and longitudinal stresses.

3. Post-installation

a. The longitudinal curvature stresses calculated for stage 2.c. above are used again here.

b. External pressure stresses from 2.d. apply.

c. Hoop and longitudinal stresses resulting from the final hydrostatic test are calculated.

4. In-service

a. Curvature -see 2.c.

b. External pressure -see 2.d.

c. The maximum working pressure of the pipeline is used in calculating longitudinal and hoop

stresses that will be imposed during service.

C. ALLOWABLE STRESSES - Having determined the individual and combined stresses at each stage of construction and those for the in-service condition, they must be compared with allowable limits.

1. ASME B31.8 -1992, Table A842.22 provides the following limits:

- Maximum allowable longitudinal stress: 80% SMYS.
- Maximum allowable hoop stress: 72% SMYS.
- Maximum allowable combined stress: 90% SMYS.

(Where SMYS is the Specified Minimum Yield Strength of the pipe material).

2. Regulatory bodies may impose additional limits to those specified above - owner companies should identify any such further constraints and ensure the adequacy of the design.

V. PIPELINE COATING

A. INTRODUCTION - Coatings are applied to provide a corrosion barrier and an abrasion barrier. Directional crossings generally encounter varying materials and often can be exposed to extra abrasion during the pullback. An outer abrasion resistant overcoat is often warranted. To facilitate the pullback of the pipeline the coating should bond well to the pipe to resist soil stresses and have a smooth, hard surface to reduce friction and maintain the corrosion barrier. As in any pipeline construction, the recommended external coating system should be compatible with any specifications for the field joint coating or any internal coating.

B. PIPE COATING - The recommended pipe coating is mill applied fusion bonded epoxy (FBE). The recommended minimum thickness is 20 mils.

C. JOINT COATING - The coating application of the weld area is the most critical field operation to maintain a smooth abrasion-resistant pipe string. It is recommended that the girth weld be coated with FBE powder utilizing the induction heating coil and powder application machine to a minimum dry film thickness of 25 mils. As an alternate, two component catalyzed liquid epoxy may be applied to the girth weld area to a minimum dry film thickness of 25 mils using a paint brush or roller. Tape should never be used for joint coating on the pullback portion of a directional crossing.

D. COATING REPAIR - It is recommended that small coating damaged areas be repaired with a polymeric melt stick patching material. Holidays larger than 1 in. in diameter should be repaired utilizing the two component catalyzed liquid epoxy applied with a paint brush or roller. Tapes should never be used for repair of coating damaged areas on the pullback portion of a directional crossing.

E. ABRASION RESISTANT OVERCOAT - As an extra abrasion resistant barrier for crossings that may encounter stones, boulders or solid rock it is recommended the FBE coated pipeline be over-coated with an epoxy-based polymer concrete. The material should be applied at a mill or with a portable yard coating machine to a minimum thickness of 40 mils. Girth weld and coating damaged areas should be field coated using an epoxy-based polymer concrete compatible with the overcoat material. The patch material should be applied so the material tapers uniformly and feathers into the original coating. Stability of the pipeline in drilled crossings is not normally a concern so a Portland cement type concrete coating is not recommended.

VI. DRILLING SLURRY - CONTAINMENT, RECYCLING AND DISPOSAL

A. BACKGROUND - The directional crossing process requires the use of large volumes of slurry that

provide the following functions:
1. Hydraulic cutting with a jet.
2. Provide energy to the drill motor.
3. Lubricate the cutting head.
4. Transport drill cuttings to the surface.
5. Stabilize the hole against collapse.
6. Guard against loss of slurry into surrounding formations.

B. SLURRY COMPOSITION -The slurries most commonly used are bentonite based. Bentonite is a naturally occurring Wyoming clay known for its hydrophilic characteristics. Often polymer extenders are also added to enhance certain characteristics. Material Safety Data Sheets (MSDS) are readily available from suppliers and can be presented to regulatory/disposal authorities.

C. CONTAINMENT - The slurry is pumped downhole and circulates back to the surface and collected in "return pits." These pits typically have a volume of at least 500 cu ft. Depending on the nature of the project, the slurry is pumped from the return pits to a "settling and containment pit." These pits vary in size depending on pumping rates and contain the slurry for recycling or disposal.

D. RECYCLING SLURRY - Slurry that has been circulated downhole and collected in the containment pit is then passed through machinery that separate the cuttings from the slurry. This process involves a series of shaking sieves and various size hydroclones.

E. SLURRY AND CUTTINGS DISPOSAL - Significant amounts of slurry are normally disposed of at the end of a project. Economics for disposal is extremely site specific. This slurry can be disposed of by:
1. Use at another drilling location.
2. Spread onto raw land for water retention improvement.
3. Evacuate to a dump site.

If working in an area of contaminated ground, the slurry should be tested for contamination and disposed of in a manner which meets governmental requirements.

F. COST MITIGATION FOR THE OWNER - With prebid planning and research, the owner can realize significant savings in slurry disposal. It is in the owner's interest to define and specify all disposal issues. In particular:
1. Define an approved disposal site as part of the project specifications.
2. Because it is difficult to estimate disposal quantities, disposal should be a separate bid item as either "cost plus" or on "unit rates."
3. Inadvertent returns are not uncommon and difficult to predict. The issue should be fairly represented to permitting bodies prior to construction. Contingency plans for containment and disposal of inadvertent returns should be priced as a separate bid item and agreed prior to construction.

VII. CONDITIONS OF CONTRACT

Always utilize a written contract to maximize communication and minimize controversy. A contract should be used to anticipate what the parties intend to do if a problem occurs on the job. The contract should be readable and understandable.

A. The Bid Package - A proposal presented by a contractor to the owner is an offer by the contractor, that becomes a binding contract if accepted by the owner. The parties, price and performance must be specified. Define the project to be undertaken by detailing the scope of work and incorporate all plans and specifications from the bid package.

B. DIFFERING GROUND CONDITIONS AND WALKAWAY PROVISION - Owners should accept the responsibility of performing an adequate geotechnical investigation. Despite adequate testing of ground conditions, unknown, unusual, and/or unexpected ground conditions may be encountered. The contract should provide solutions when the project encounters differing ground conditions. The walkaway provision in the contract should entitle the contractor to stop work and walk away from the job without the owner having the right to take over the contractors equipment. The contractor should be entitled to receive compensation for demobilization, lost profits and work performed prior to walkaway. If the project is completed, the contractor should be paid on a cost-plus basis. Assumption of risk of unforseen ground conditions by the contractor affects the bid price.

C. ENVIRONMENTAL CONCERNS - Before the project begins, address environmental concerns because owners and contractors are included as potentially responsible parties when environmental damages and cleanup costs are assessed. Federal, state and local laws must be evaluated and licensing, permitting and other regulations must be followed. Directional crossings that damage soil or water may cause liability.

1. Turbidity of Water and Inadvertent Returns - As these events are difficult to predict and work stoppage may occur, the contract should offer a mechanism to mutually address and mitigate the problem. Liabilities are generally shared by both the contractor and owner and many times can be insured.

2. Slurry Disposal - Comply with the regulations of the area regarding slurry disposal. Slurry disposal should be referred to in the contract and bid as a separate line item on a cost plus or unit price basis.

D. ALLOCATION OF RISK OF LOSS - Evaluate and allocate risks of loss that may occur during the project. Owners should share the risk of loss rather than shifting all the losses through the indemnification to the contractor because the bid price is directly affected by contingent losses. Insurance may provide coverage by third parties for losses from differing ground conditions or environmental losses.

E. DISPUTE RESOLUTION - Provide for dispute resolution in the event of controversy by including mediation or arbitration provisions in the contract. Disputes should be resolved in the following order: 1) negotiation, 2) nonbinding mediation through a third party, 3) binding arbitration and lastly, 4) litigation. Determine who should be parties to the resolution, what law will be used and where the dispute will be resolved.

A Contract Law Seminar notebook with recommended model provisions is available from the office of the DCCA.

This document is provided courtesy of:
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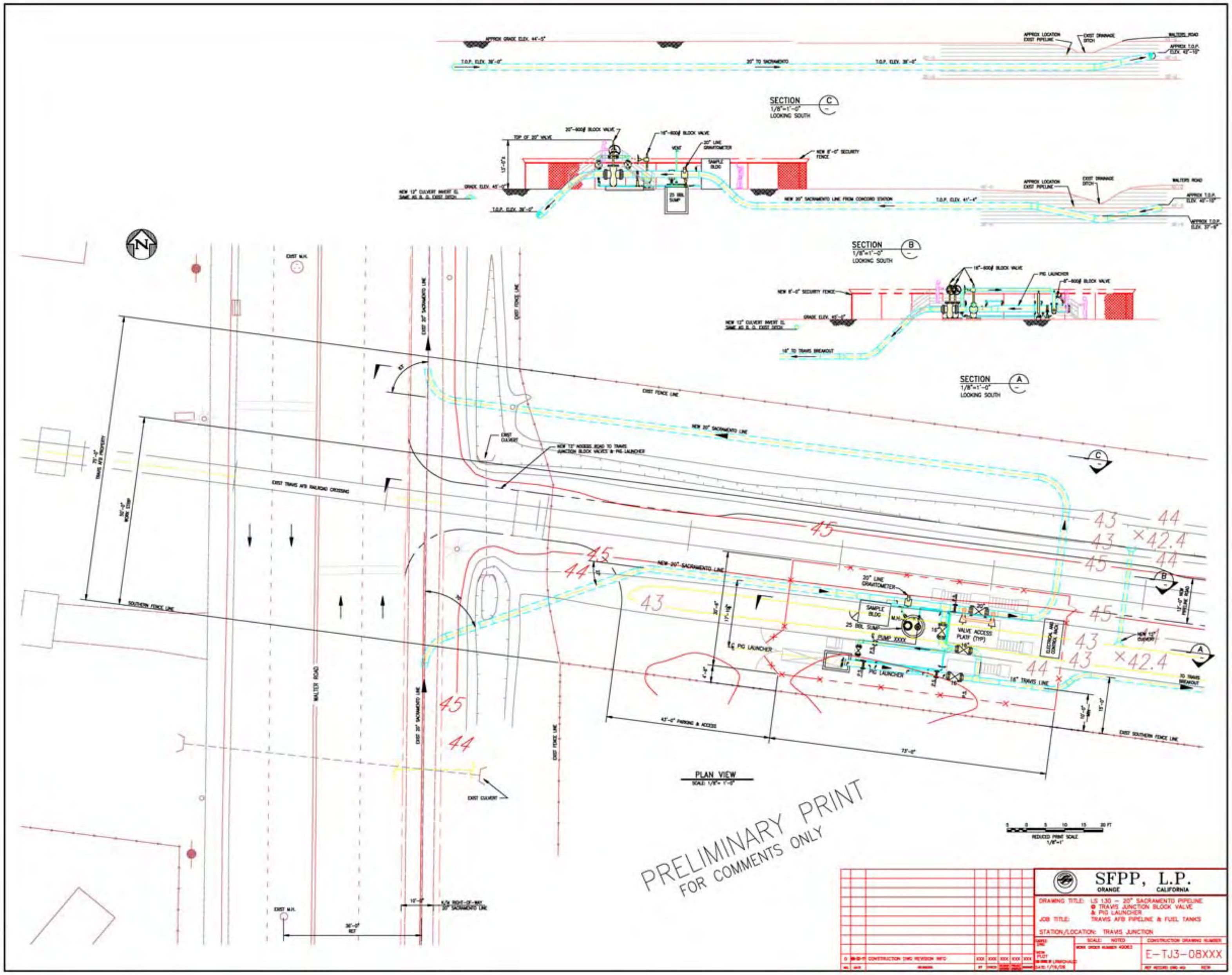
Appendix C
Travis Junction Design



Preliminary Facility Layout Drawing - Launcher

Appendix D
Hydrological Assessment

Hydrological Assessment for the Travis AFB Fuel Storage Tank and Pipeline Project

1.0 Introduction

The Travis Air Force Base (AFB) is proposing a new fuel storage tank and pipeline project. This project will change existing land cover within the project site by converting an area that historically was a waste dumping site used by the Base (with some areas covered in concrete and asphalt, and others in bare ground and grassland) to impervious surfaces. Planned construction activities include the installation of a new fuel pipeline, three new fuel storage tanks, and an equipment area near the fuel storage tanks, as well as a paved access road around the perimeter of the site. This hydrologic analysis evaluates areas that are permanently changed from pervious to impervious cover, which includes the footprint of the fuel tank sites, the equipment storage site, and the paved access road (Figure 1). Because installation of the pipeline will include backfilling with native soil, it will not permanently change the surface conditions; therefore, the pipeline construction area is not included in the hydrologic analysis. This hydrologic analysis was prepared to understand how storm water runoff patterns will likely change (including runoff volume, flow rate, and flow velocity) due to the proposed construction, and how any changes may affect on-base resources.

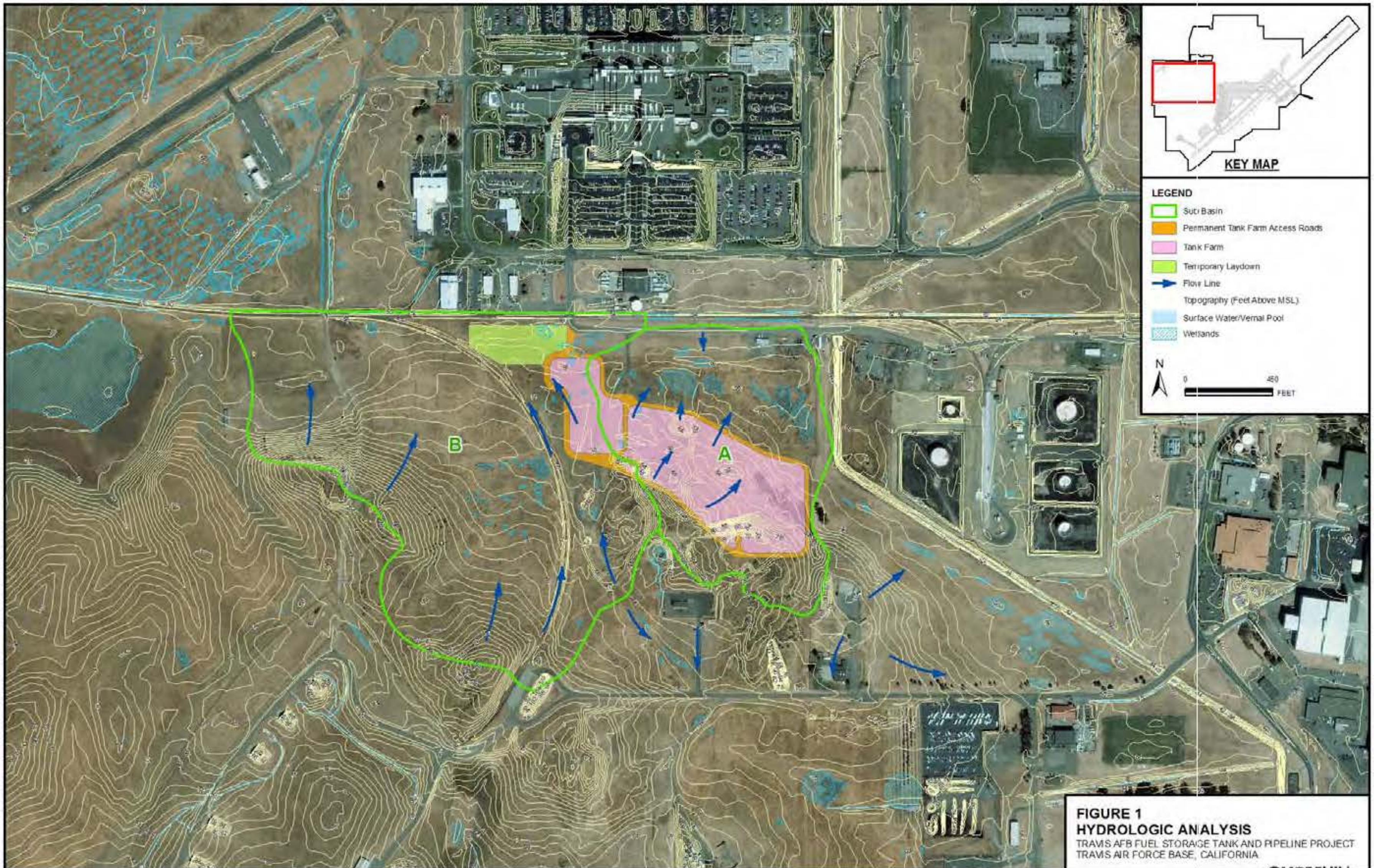
The technical analysis includes determination of rainfall amounts and patterns, quantification of change in impervious cover and time of concentration, as well as assessment of change in runoff volumes, flow rates, and velocities. Five storm events will be used to formulate various scenarios with pre- and post-development comparisons to evaluate change.

1.1 Proposed Fuel Storage Tank and Pipeline Construction

The proposed fuel storage tank is located south of Air Base Parkway and Hangar Ave and the pipeline extends parallel to Air Base Parkway until Walters Rd.

The footprint of the new fuel storage tanks, the equipment area, and new access roads will occupy 17.79 acres, and change some areas that are currently pervious into impervious areas. It is estimated that in Sub-Basin A, 10.2 acres (which comprise 40.8% of the catchment) will be converted to impervious cover. In Sub-Basin B, 5.29 acres (which comprise 8.1% of the catchment) will be converted to impervious cover.

For the actual fuel tank facility, a concrete pad will be constructed as a foundation for the fuel tank structures. The facility will surrounded by a concrete berm to act as containment for the fuel tanks, with an outlet or several outlets to drain stormwater onto the adjacent landscape. As of the writing of this report, specific plans for grading of the development site, as well as placement of the stormwater drain outlet(s) for the fuel tank facility had


KEY MAP
LEGEND
Sub Basin
Permanent Tank Farm Access Roads
Tank Farm
Temporary Laydown
Flow Line
Topography (Feet Above MSL)
Surface Water/Vernal Pool
Wetlands
N
0
450
FEET
A
B
FIGURE 1
HYDROLOGIC ANALYSIS
TRAVIS AFB FUEL STORAGE TANK AND PIPELINE PROJECT
TRAVIS AIR FORCE BASE, CALIFORNIA
CH2MHILL

not yet been determined. For the purposes of this analysis, it is assumed that the fuel tank facility will drain into outlet(s) in the orientation of existing flow paths depicted in Figure 1.

The new pipeline will be a subsurface feature covered with native soils; thus associated land cover is not expected to change.

2.0 Land Cover and Drainage

Travis AFB is located in the northeastern portion of the Fairfield-Suisun Hydrologic Basin. Within the basin, water generally flows south to southeast toward Suisun Marsh, an 116,000-acre tidal marsh that is the largest contiguous estuarine wetland in the continental United States. Suisun Marsh drains into Grizzly and Suisun bays. Water from these bays flows through the Carquinez Strait to San Pablo Bay and San Francisco Bay, and ultimately discharges into the Pacific Ocean near the City of San Francisco.

Union Creek is the primary surface water pathway for runoff at Travis AFB. The headwaters of Union Creek are located approximately 1 mile north of the Base, near the Vaca Mountains, where the creek is an intermittent stream. Union Creek splits into two branches north of the Base. The West Branch of Union Creek flows south and enters the northwestern border of Travis AFB east of the David Grant Medical Center in an excavated channel. This channel flows south to a culvert under the runway and discharges to the main channel of Union Creek, which then discharges into Hill Slough, a wetland located 1.6 miles from the Base boundary. Surface water from Hill Slough flows into Suisun Marsh (Figure 2).

The surface water collection system divides the Base into eight independent drainage areas. The eastern portion of the Base is served by one of the drainage systems that collects runoff from along the runway and the inactive sewage treatment plant area and directs it to Denverton Creek and Denverton Slough. Denverton Creek is an intermittent stream in the vicinity of the Base. The northwestern portion of the Base drains to the west toward the McCoy Creek drainage area. McCoy Creek is also an intermittent stream in the vicinity of the Base. With the exception of these drainages, the remaining six drainage areas at the Base empty into Union Creek. All of the surface water bodies on and in the vicinity of the Base empty into the Suisun Marsh. No springs have been recorded within the confines of Travis AFB.

2.1 Land Cover and Drainage at the Project Site

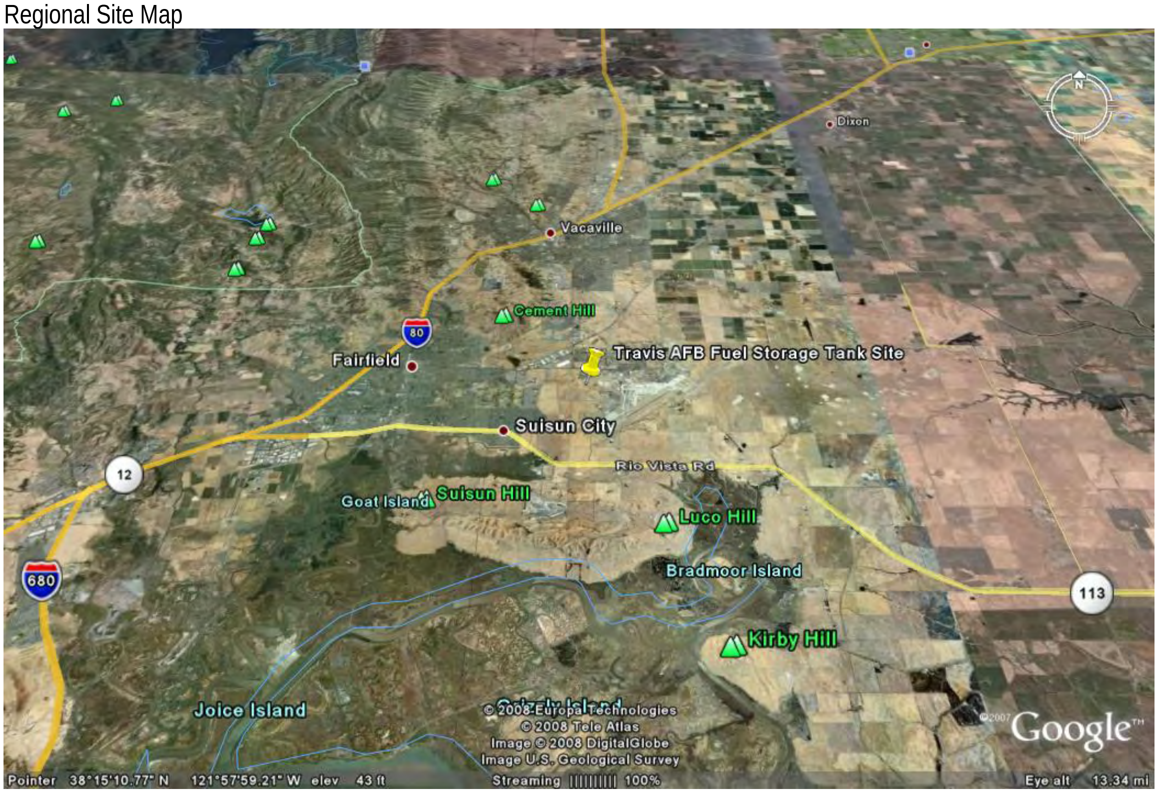
The project site is composed of disturbed herbaceous-dominant vegetation characteristic of the Solano-Colusa Vernal Pool Region. The vegetation community includes a grassland / vernal pool complex, which has been degraded by surface alterations, including dirt road construction and the introduction of invasive grasses. An earthen and asphalt berm surrounds the vernal pool complex along its southern and western edge in order to prevent surface flows from the waste dump from reaching the vernal pools. Water is diverted to the north and east along this berm. The mounded topography in the project area is partially related to the dumping of concrete, asphalt, and other waste

products over the past several decades. The site topography is naturally higher in the south and slopes to the north.

The project site lies within two sub-basins (displayed in Figure 1). Sub-Basin A is approximately 31 acres in size, and drains northward and eastward to a series of vernal pools on the northern portion of the site. This basin lies within the Union Creek watershed, but is hydraulically disconnected from the creek (although shallow groundwater interactions likely occur). Sub-Basin B is approximately 65 acres in size, and drains northward and westward to vernal pool complexes and ultimately into a railroad ditch which directs surface flows towards the McCoy Creek channel.

Travis AFB has limited topographic relief, and the clayey soils prevent rapid drainage. The swale topography leads to the formation of vernal pools. The annual cycle of vernal pools includes standing water during the winter and spring and desiccation during the summer and fall. During the time that the vernal pools contain water, biotic communities develop over relatively restricted areas. In the larger areas, grasslands form; in more confined, deeper areas, wetlands form. In Sub-Basins A and B, surface and shallow subsurface runoff drains into complexes of vernal pools and wetlands; no concentrated drainage features (such as channels or gullies) are currently present.

FIGURE 2.
Regional Site Map



2.2 Soils at the Project Site

Determination of storm water runoff is dependent on both land cover and soil characteristics. The more impervious a surface is (e.g., a runway is nearly 100% impervious) the quicker it becomes runoff.

Soils in the project area include the Antioch–San Ysidro Complex – 0–2 % slopes and the Altamont–San Ysidro-San Benito Complex – 2–9 % slopes.

Antioch–San Ysidro Complex – 0–2 % slopes

The Antioch–San Ysidro Complex occupies the northern and eastern parts of the project area and affected subbasins.

These soils formed in alluvium from sedimentary sources. This complex is about 50% Antioch loam and 35% San Ysidro sandy loam. The remaining 15% is included small areas of Solano loam and Pescadero clay loam. Permeability is very slow. Both the Antioch and San Ysidro soils have very slow runoff. Erosion is a slight hazard (USDA, 1977).

Altamont–San Ysidro-San Benito Complex – 2–9 % slopes

The Altamont–San Ysidro-San Benito Complex occupies the southern and western parts of the project area and affected subbasins.

This complex is about 60% Altamont clay, 20% San Ysidro sandy loam, and 15% San Benito clay loam. The remaining 5% consists of small inclusions of Diablo clay and Ayar clay. The Altamont soil is generally on side slopes, the San Ysidro soil is in drainageways and swales, and the San Benito soil is on rounded hilltops. Permeability is generally slow. For the Altamont series, the profile is 28 to 40 inches deep, water capacity is 4 to 7 inches, runoff is slow to medium, and erosion is a slight hazard. For the San Ysidro series, the profile is 12 to 20 inches deep to the heavy clay loam subsoil, water capacity is 3 to 5 inches, runoff is medium, and erosion is a moderate hazard. For the San Benito series, runoff is medium, and erosion is a moderate hazard (USDA, 1977).

Hydrologic Soil Groups

Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D, where A's generally have the smallest runoff potential and D's have the greatest (details of this classification can be found in 'Urban Hydrology for Small Watersheds' published by the Engineering Division of the Natural Resource Conservation Service, United States Department of Agriculture, Technical Release–55).

Group A includes sand, loamy sand or sandy loam types of soils. They have low runoff potential and high infiltration rates when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission.

Group B includes silt loam or loam. They have a moderate infiltration rate when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures.

Group C soils are sandy clay loam. They have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure.

Group D soils are clay loam, silty clay loam, sandy clay, silty clay or clay. This HSG has the highest runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface and shallow soils over nearly impervious material.

The Antioch–San Ysidro Complex – 0–2 % slopes and the Altamont–San Ysidro-San Benito Complex – 2–9 % slopes are both classified as Hydrologic Soil Group D, with low permeability and moderate to high runoff potential.

3.0 Model Development

A hydrologic model was used to determine changes in pre- and post-development hydrology for the project site.

The hydrologic model used for analysis was WinTR-55, Urban Hydrology for Small Watersheds, which was developed by the USDA Soils Conservation Service (now Natural Resource Conservation Service (NRCS)) as a simplified procedure to calculate the storm runoff volume, peak rate of discharge, hydrographs and storage volumes required for storm water management structures. WinTR-55 is a single-event rainfall-runoff small watershed hydrologic model. The model generates hydrographs from both urban and agricultural areas and at selected points along the stream system. Hydrographs are routed downstream through channels and/or reservoirs. Multiple sub-areas can be modeled within the watershed. WinTR-55 is an appropriate hydrologic model to use in watersheds less than 25 square miles, with less than 10 sub-areas, and a time of concentration of less than 10 hours. A thorough description of the TR-55 model can be found on-line at
http://www.wsi.nrcs.usda.gov/products/W2Q/H&H/Tools_Models/WinTR55.html.

Using WinTR-55, basic runoff calculations were performed for Sub-Basins A and B to determine runoff volume, flow rate, and flow velocities for pre- and post- development conditions. Methods used to derive hydrologic model data inputs and summaries of the data inputs are described below.

3.1 Drainage Area and Runoff Curve Number Data

A sub-basin (or catchment) has three key elements: the type of land cover, type of hydrologic soil group, and land cover condition. These elements determine the SCS Runoff Curve Number, an expression of how much rainfall is absorbed before runoff occurs.

Drainage basins for the project site were delineated using 2-foot contour topographic data. Principal drainage areas for the project site include Sub-Basins A and B (Figure 1). Land cover data for pre-development conditions was classified as herbaceous, in fair condition.

GIS shapefiles supplied by Kinder Morgan on January 21, 2009 provided the location and spatial extent of the post-development project footprint. It was assumed that all structures associated with the fuel storage tanks, equipment area, and surrounding paved areas will be impervious. It was also assumed that stormwater runoff from the development footprint will be allowed to drain freely into the downstream areas of the catchments (either through unrestricted overland flow or routed into a culvert and discharged from the development site onto the downslope areas), and will not be collected and routed into a subsurface storm drain network.

All soils in Sub-Basins A and B were determined to be Hydrologic Soil Group D.

The land cover type, hydrologic soil group type, land cover condition, and Runoff Curve Number for pre- and post-development conditions within each Sub-Basin are included in Table 1.

TABLE 1.
Catchment Data

Pre-Development Catchment Data						
Catchment Name	**Cover Description**	**Condition**	**Hydrologic Soil Group**	**Area (Acres)**	**Runoff Curve Number**	**Weighted Runoff Curve Number**
Sub-Basin A	Arid and Semi-arid Rangelands - Herbaceous	Fair	D	30.8	89	89
Sub-Basin B	Arid and Semi-arid Rangelands - Herbaceous	Fair	D	64.7	89	89
Post-Development Catchment Data						
Sub-Basin A	Impervious Areas – Paved Parking Lots, Roofs, Driveways	-	D	12.6	98	93
	Arid and Semi-arid Rangelands - Herbaceous	Fair	D	18.2	89	
Sub-Basin B	Impervious Areas – Paved Parking Lots, Roofs, Driveways	-	D	5.2	98	90
	Arid and Semi-arid Rangelands - Herbaceous	Fair	D	59.5	89	

3.2 Time of Concentration Data

SCS (1986) indicates that there are typically three distinct runoff patterns in a watershed - sheet flow, shallow concentrated flow, and channel flow. Sheet flow occurs in the upper reaches of a watershed and persists for a maximum of 100 feet. After flowing in sheets, water then typically becomes less sheet-like and more concentrated. Following shallow

concentrated flow, water typically collects in natural or man-made channels. Each of the flow patterns requires a unique mathematical expression (see Appendix A).

The Time of Concentration (T_c) is generally defined as the time required for a drop of water to travel from the most hydrologically remote point in the subcatchment to the point of collection. This starts by determining the T_c path, as defined above. The path is then broken into segments according to the type of flow (segments of sheet flow, shallow concentrated flow, and channel flow, depending on the exact site conditions). Adding the T_c for all segments yields the total Time of Concentration for the subcatchment. The factors affecting the Time of Concentration include surface roughness, channel shape and flow patterns, and slope.

Because Sub-Basins A and B are not hydraulically connected to surface water features by stream channels or gullies, it was assumed that runoff occurs as sheet flow and shallow concentrated flow. Sheet flow was estimated to continue on path for 100 feet from the most distant point within the sub-basin towards the sub-basin outlet (in this case the wetland or vernal pool "sink"). For pre-development conditions, roughness was determined to be "short range grass" (Manning's n = .15). For post-development conditions, it was assumed that sheet flow roughness was "smooth surface" (Manning's n = .011). Shallow concentrated flows were calculated within each basin by measuring the distance between termination of sheet flows and the outlet within each Sub-Basin. Shallow concentrated flows were considered to be unpaved for pre-development conditions, and paved for post-development conditions along the length of the planned development footprint.

For pre-development conditions, slopes for sheet flow and shallow concentrated flows were calculated using 2-foot topography. For post-development conditions, it was assumed that a flat landing would be graded for the fuel tank sites, the equipment storage site, and the paved access road. This would require excavation of the steeper topography currently within the development footprint, and results in a decrease in the flowpath gradient for post-development sheet flow and shallow concentrated flows.

The type of flow, length, roughness, and T_c data for pre- and post-development conditions within each Sub-Basin are included in Table 2.

TABLE 2.
Time of Concentration Data

Catchment Name	Flow Type	Length (ft)	Slope (ft/ft)	Roughness (Manning's n)	T_c (hr)
Pre-Development Catchment Data					
Sub-Basin A	Sheet Flow	100	0.18	Range Grass-Short (0.15)	0.223
	Shallow Concentrated Flow	845	0.01	Unpaved	
Sub-Basin B	Sheet Flow	100	0.16	Range Grass-Short (0.15)	0.610
	Shallow Concentrated Flow	2375	0.006	Unpaved	
Post-Development Catchment Data					
Sub-Basin A	Sheet Flow	100	0.003	Smooth Surface (0.011)	0.239
	Shallow Concentrated Flow	575	0.003	Paved	
	Shallow Concentrated Flow	270	0.01	Unpaved	
Sub-Basin B	Sheet Flow	100	0.003	Smooth Surface (0.011)	0.632
	Shallow Concentrated Flow	600	0.003	Paved	
	Shallow Concentrated Flow	1775	0.005	Unpaved	

3.3 Design Storm Amounts

The amount of precipitation falling onto a catchment over a given time interval will influence the amount of stormwater runoff that occurs at a given site.

The highest peak discharges from small watersheds in the United States are usually caused by intense, brief rainfalls that may occur as distinct events or as part of a longer storm. These intense rainstorms do not usually extended over a large area and intensities vary greatly. It is for these reasons that synthetic rainfall distributions are used instead of observed data. These distributions include maximum rainfall intensities for the selected design frequency arranged in a sequence that is critical for producing peak runoff.

Because the intensity of rainfall varies considerably during a storm as well as between different geographic regions, the SCS (NRCS) has developed four synthetic 24-hour rainfall distributions (I, IA, II and III) based upon duration-frequency data and local storm data recorded by the National Weather Service (NWS). Types I and IA represent the Pacific maritime climate with wet winters and dry summers.

A storm event is defined by the probability or frequency of how often it occurs (expressed as number of occurrences annually), the duration it lasts (in hours), and how

much precipitation falls (in inches). Another consideration is the nature of how the precipitation falls over the event duration (the rate of rainfall, usually expressed as inches per hour).

For this analysis, storm data were input from NRCS Type I synthetic rainfall distributions for Northern California. Type I distributions were chosen because they represent the most intense storms as compared to Type IA, and thus provide the most conservative estimate of potential hydrology. A 24-hour rainfall amount for hypothetical 2-year, 5-year, 10-year, 50-year, and 100-year storms was used.

Table 3 summarizes the rainfall information for the Solano County, California site used for this analysis.

TABLE 3.
Precipitation Data

Duration	Rainfall Amount by Return Period (inches)				
	2-year	5-year	10-year	50-year	100-year
24-hour	2.4	2.9	3.5	4.5	5.1

Source: NOAA, 1973

4.0 Results

WinTr-55 uses a set of standard surface flow routing equations to compute peak flows, volumes, and velocities. These equations are included in Appendix A. The results of the hydrologic analyses for the Travis AFB fuel storage tank and pipeline project are expressed as pre- and post-development runoff conditions for each sub-basin (Tables 4 and 5). Hydrographs for the pre-development and post-development conditions in Sub-Basin A are presented in Figures 3 and 4.

TABLE 4.
Sub-Basin A Hydrology

Stormwater Runoff Attribute	Storm Event				
	2-year	5-year	10-year	50-year	100-year
Pre-Development Conditions					
Volume (acre-feet)	3.51	4.64	6.05	8.46	9.92
Runoff Amount (inches)	1.37	1.81	2.36	3.30	3.87
Peak Flow (cfs)	19.8	26.4	34.8	49.0	57.4
Average Velocity (ft/sec)	1.18	*Not available*			
Post-Development Conditions					
Volume (acre-feet)	4.34	5.54	7.01	9.52	11.04
Runoff Amount (inches)	1.69	2.16	2.73	3.71	4.30
Peak Flow (cfs)	24.2	31.1	39.3	52.8	61.0
Average Velocity (ft/sec)	1.10	*Not available*			

FIGURE 3.
Runoff Curve for Pre-Development Conditions in Sub-Basin A

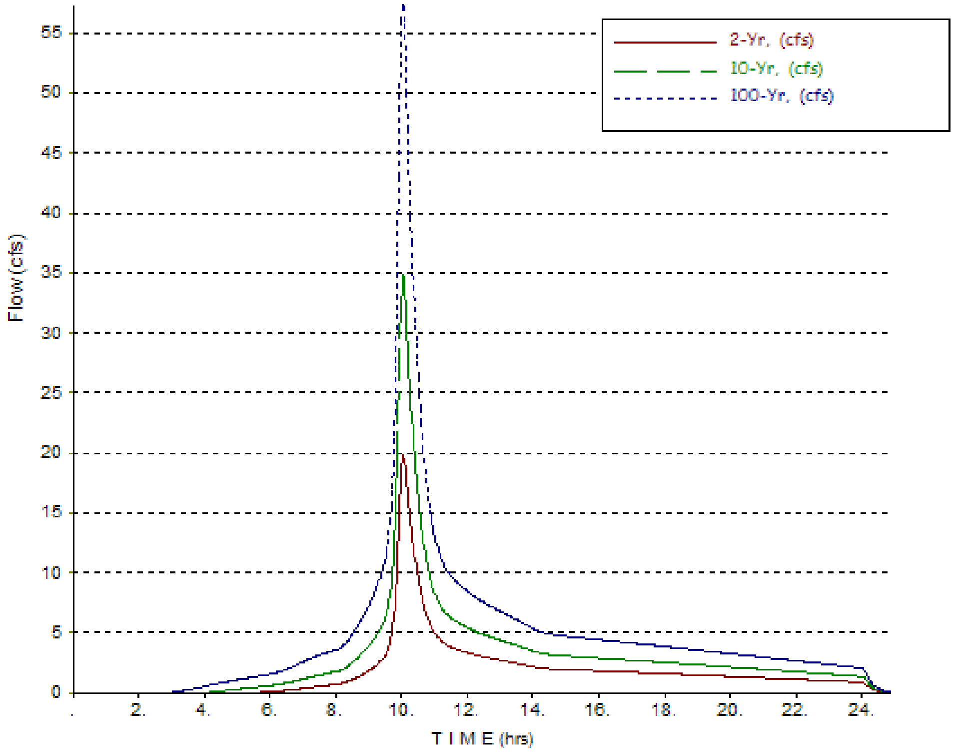


FIGURE 4.
Runoff Curve for Post-Development Conditions in Sub-Basin A

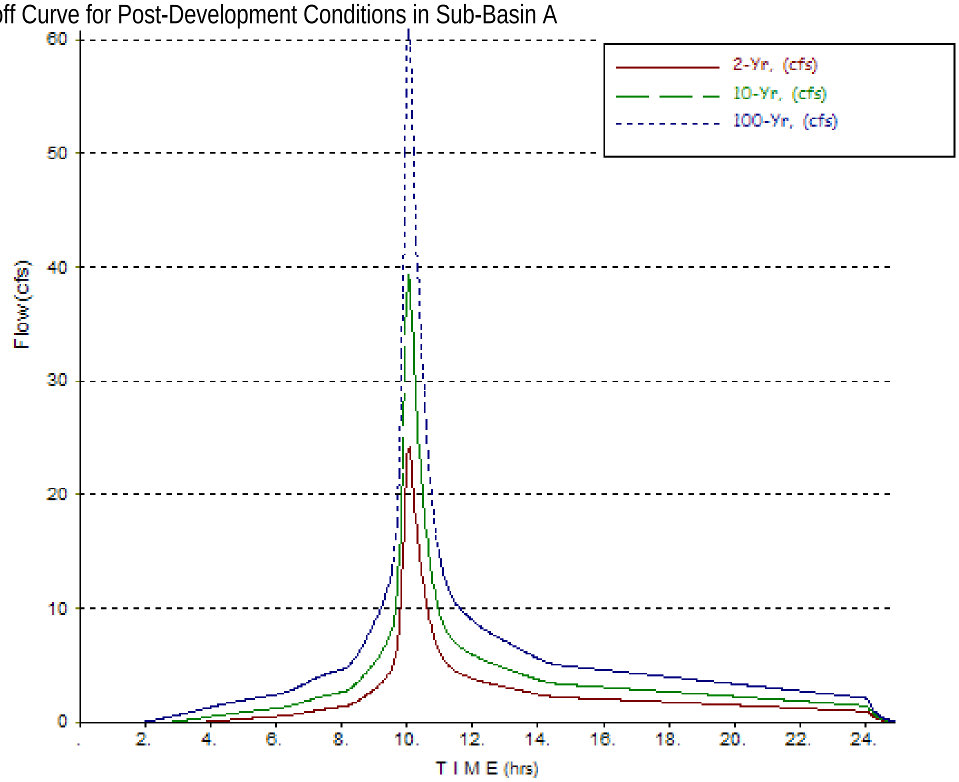


TABLE 5.
Sub-Basin B Hydrology

Stormwater Runoff Attribute	Storm Event				
	2-year	**5-year**	**10-year**	**50-year**	**100-year**
Pre-Development Conditions					
Volume (acre-feet)	7.36	9.75	12.70	17.75	20.83
Runoff Amount (inches)	1.37	1.81	2.36	3.30	3.87
Peak Flow (cfs)	23.5	31.7	42.0	59.4	69.9
Average Velocity (ft/sec)	1.13	*Not available*			
Post-Development Conditions					
Volume (acre-feet)	7.76	10.18	13.20	18.32	21.39
Runoff Amount (inches)	1.44	1.89	2.45	3.40	3.97
Peak Flow (cfs)	24.5	32.7	42.9	59.9	70.3
Average Velocity (ft/sec)	1.09	*Not available*			

Hydrographs for the pre-development and post-development conditions in Sub-Basin B are presented in Figures 5 and 6.

FIGURE 5.
Runoff Curve for Pre-Development Conditions in Sub-Basin B

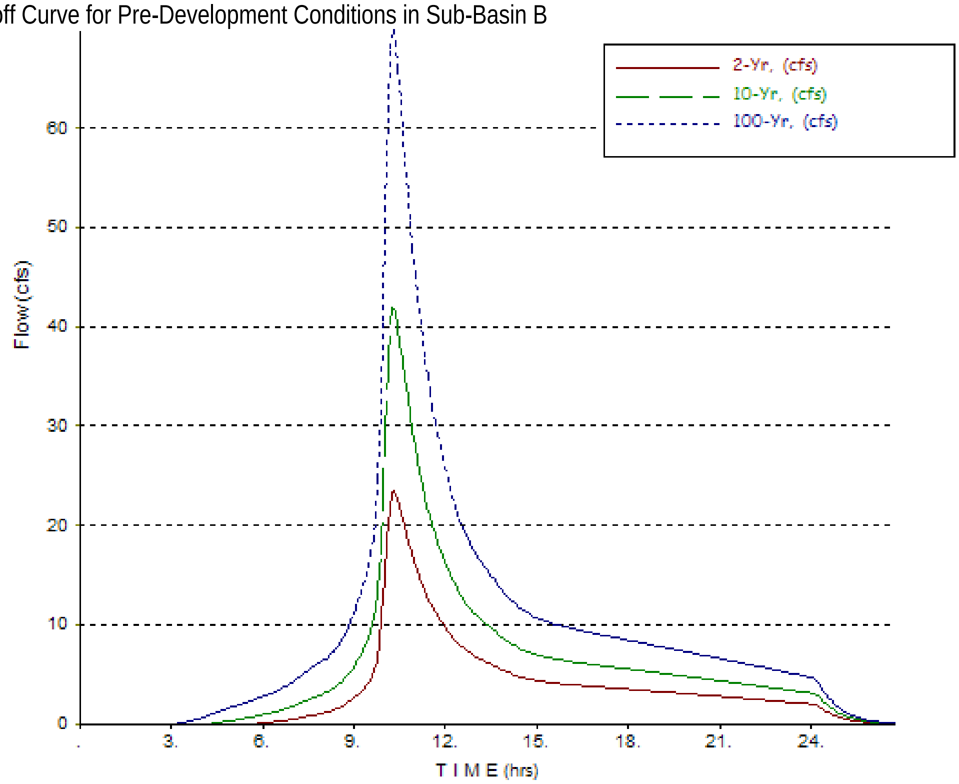
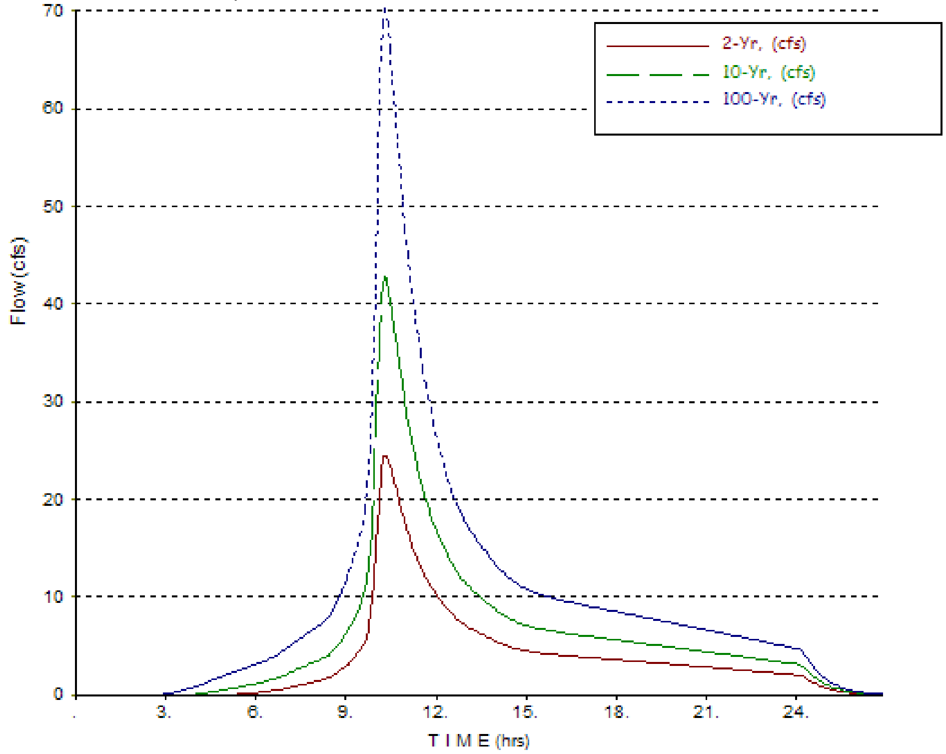


FIGURE 6.
Runoff Curve for Post-Development Conditions in Sub-Basin B



The changes in peak hourly runoff and total runoff volumes from the project site, pre-development and post-development, are presented in Tables 6 and 7.

TABLE 6.
Comparison of Peak Hourly Runoff in Pre-Development and Post-Development Conditions

Occurrence of 24-Hour Storm Event	Peak Hourly Runoff (CFS)					
	Sub-Basin A			Sub-Basin B		
	Pre-Development	Post-Development	Change	Pre-Development	Post-Development	Change
2-Year	19.8	24.2	**+ 4.4**	23.5	24.6	**+ 1.1**
5-Year	26.4	31.1	**+ 4.7**	31.7	32.7	**+ 1.0**
10-Year	34.8	39.3	**+ 4.5**	42.0	42.9	**+ 0.9**
25-Year	49.0	52.8	**+ 3.8**	59.4	59.9	**+ 0.5**
100-Year	57.4	61.0	**+ 3.6**	69.9	70.3	**+ 0.4**

TABLE 7.
Comparison of Total Runoff Volume in Pre-Development and Post-Development Conditions

Occurrence of 24-Hour Storm Event	Total Runoff Volume (Acre-Feet)					
	Sub-Basin A			Sub-Basin B		
	Pre-Development	Post-Development	Change	Pre-Development	Post-Development	Change
2-Year	3.51	4.34	**+ 0.83**	7.36	7.76	**+ 0.40**
5-Year	4.64	5.54	**+ 0.90**	9.75	10.18	**+ 0.43**
10-Year	6.05	7.01	**+ 0.96**	12.70	13.20	**+ 0.50**
25-Year	8.46	9.52	**+ 1.06**	17.75	18.32	**+ 0.57**
100-Year	9.92	11.04	**+ 1.12**	20.83	21.39	**+ 0.56**

4.1 Pre- and Post-Development Hydrology in Sub-Basin A

In Sub-Basin A, 40.8% of the catchment would be converted from pervious groundcover to impervious surfaces, thus it would be assumed that flow rates and volumes would increase substantially. Hydrologic analysis show peak flow rates increasing as a result of the development project (see Table 6). For example, the 2-year storm peak flows increase from 19.8 cfs to 24.2 cfs (+4.4 cfs, a 22% increase from pre-development conditions), and the 100-year peak flows increase from 57.4 cfs to 61.0 cfs (+3.6 cfs, a 6% increase from pre-development conditions). On average, post-development peak flows are increased by 13% compared to pre-development conditions.

The volume of runoff for post-development conditions is also increased relative to pre-development conditions in Sub-Basin A (see Table 7). The 2-year storm produces 3.51 acre-feet in the pre-development condition vs. 4.34 acre-feet in the post-development condition, an increase of 24%. The 100-year storm produces 9.92 acre-feet in the pre-development condition vs. 11.04 acre-feet in the post-development condition, an increase of 11%. On average, post-development runoff volumes are increased by 17% compared to pre-development conditions.

These increases in the peak flow rates and volumes of runoff are attributed to the increase in impervious area within Sub-Basin A, which correspondingly increase the Runoff Curve Number (RCN) from 89 to 93, thus increasing the concentration of flow that is delivered to the receiving areas.

The post-development conditions assume that the site will be graded level within the area of the proposed fuel tank storage facilities. This will remove some of the steeper topography present in Sub-Basin A, which reduces the slope of the runoff. The reduced gradient slows the velocity of stormwater runoff. As a result, the time of concentration for the pre-development condition is actually shorter (meaning that peak flow rates increase as water is delivered to the catchment outlet more rapidly) than the time of concentration for the post-development condition (0.223 hours for pre-development vs. 0.239 hours for post-development).

4.2 Pre- and Post-Development Hydrology in Sub-Basin B

In Sub-Basin B, 8.1% of the catchment would be converted from pervious groundcover to impervious surfaces. The hydrologic analysis show peak flow rates experiencing a minor increase as a result of the development project (see Table 6), with an average increase of 2% for all storm events.

The volume of runoff for post-development conditions is also increased relative to pre-development conditions in Sub-Basin B (see Table 7), with an average of increase of 4% for all storm events.

5.0 Potential Impacts on Natural Communities

As a result of the proposed development, peak flow rates in Sub-Basin A will increase as a result of the increase in impervious area. This will increase the potential for erosion within the catchment, and will require consideration during the site design process. Increases in peak flows can be mitigated through the use of stormwater Best Management Practices (BMPs) on-site, and/or stormwater retention/detention facilities off-site.

It is anticipated that an increase in the volume of storm water runoff from Sub-Basin A will have a minor positive affect on the biotic communities in the vernal pools and wetland complexes that the development site drains to, by supplying a minor increase in the volume of water to those areas. Once again, as mentioned above, it may be necessary to attenuate the rate of water delivery to those areas so as to not increase the potential for erosion of hillslopes or channel features.

Peak flow rates in Sub-Basin B will experience a very minor increase as a result of the increase in impervious area associated with the development of the fuel storage tank facilities. The associated volume of runoff will also experience a very minor increase.

Because the degree of hydrologic alteration is minor, it is anticipated that the corresponding ecological impacts to vernal pools and wetland complexes within Sub-Basin B that the development site drains to will be negligible.

If runoff from the site is directed into a subsurface storm drain network, the results reported above would be expected to change, and it is recommended that further hydrologic analyses be performed to determine potential impacts to natural communities.

It also should be acknowledged that this hydrologic analysis provides estimates of changes in storm water runoff rates, volumes, and velocities as a result of the development of the fuel storage tank and pipeline project, but does not include analyses of potential alterations to storm water quality as a result of this project.

6.0 References

National Oceanographic and Atmospheric Administration (NOAA), Precipitation-Frequency Atlas of the Western United States (Silver Spring, Maryland, 1973), pp. 37-47.

Natural Resource Conservation Service (formerly the Soil Conservation Service). Technical Release 55: Urban Hydrology for Small Watersheds. USDA (U.S. Department of Agriculture). June 1986.

Natural Resource Conservation Service (formerly the Soil Conservation Service). Soil Survey of Solano County, CA. USDA (U.S. Department of Agriculture). May 1977.

Appendix A – WinTR-55 Equations Used in this Analysis

Runoff Equation

$$Q = \frac{\left[P - 0.2 \left(\frac{1000}{CN} - 10 \right) \right]^2}{P + 0.8 \left(\frac{1000}{CN} - 10 \right)}$$

Where

Q = runoff (in)
P = rainfall (in), and
CN = runoff curve number

Composite CN (connected impervious area)

$$CN_c = CN_p + \left(\frac{P_{im}}{100} \right) (98 - CN_p)$$

Where

CN_c = composite runoff curve number
CN_p = pervious runoff curve number, and
P_{im} = percent imperviousness

Composite CN (unconnected w/ <30% impervious)

$$CN_c = CN_p + \left(\frac{P_{imp}}{100} \right) (98 - CN_p)(1 - 0.5 R)$$

Where

R = ratio of unconnected impervious area to total impervious area

Sheet Flow

$$T_t = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} S^{0.4}}$$

Where

T_t = travel time (hr)
n = Manning roughness coefficient (for sheet flow)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in), and
s = slope of hydraulic grade line (land slope, ft/ft)

Shallow Concentrated Flow

$V = 16.1345\sqrt{s}$ (Unpaved)

$V = 20.3282\sqrt{s}$ (Paved)

Where

V = average velocity (ft/s), and
s = slope of hydraulic grade line (watercourse slope, ft/ft)

These two equations are based on a solution of the Manning equation with different assumptions for n (Manning roughness coefficient) and r (hydraulic radius, ft). For unpaved areas, n is 0.05 and r is 0.4; for paved areas, n is 0.025 and r is 0.2.

Channel Flow (Manning Equation)

$$V = \frac{1.49 r^{2/3}\sqrt{s}}{n}$$

Where

V = average velocity (ft/s), and
r = hydraulic radius (ft) and is equal to a/p_w
a = cross sectional flow area (ft^2)
p_w = wetted perimeter (ft)
s = slope of hydraulic grade line (channel slope, ft/ft)
n = Manning roughness coefficient (for open channel flow)

Appendix B – WinTR-55 Reports

J Thomas

Travis AFB Tank Farm
Post-development
Solano County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs) (hr)	5-Yr (cfs) (hr)	10-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)
SUBAREAS					
Post-Dev A	24.15 10.07	31.08 10.06	39.32 10.06	52.81 10.07	60.95 10.07
REACHES					
OUTLET	24.15	31.08	39.32	52.81	60.95

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J Thomas

Travis AFB Tank Farm
Post-development
Solano County, California

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 2-Yr (cfs) (hr)	5-Yr (cfs) (hr)	10-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)
SUBAREAS					
Post-Dev B	24.52	32.71	42.86	59.94	70.32
	10.34	10.35	10.27	10.27	10.31
REACHES					
OUTLET	24.52	32.71	42.86	59.94	70.32

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Appendix E
Preliminary Jurisdictional Determination and Delineation of Waters of the United States

JP8 FUEL PIPELINE AND TERMINAL AT TRAVIS AIR FORCE BASE

PRELIMINARY DETERMINATION AND DELINEATION OF JURISDICTIONAL WATERS OF THE UNITED STATES

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February 2009
AMEC Project No. 7554001021

CONTENTS

TABLES

APPENDICES

1.0 INTRODUCTION

Travis Air Force Base (TAFB) is proposing to construct three 150,000-barrel capacity JP 8 jet fuel tanks and a 16-inch distribution pipeline within TAFB boundaries in Solano County, California. The proposed pipeline (approximately 2,300 meters in length) will connect the proposed terminal (totaling approximately 15 acres in area) to an existing 20-inch pipeline, owned and operated by SFPP, L.P., operating partnership of Kinder Morgan Energy Partners LLP. (SFPP), west of the TAFB boundary through a property easement along an existing decommissioned railway.

SFPP and TAFB are preparing environmental documentation for approval of the proposed project through the National Environmental Policy Act and through responsible federal permitting agencies. AMEC Earth & Environmental, Inc. (AMEC) was retained by SFPP to investigate natural resources in the project area and determine the potential for impact to sensitive species and habitats.

1.1 Purpose

The purpose of this report is to provide a preliminary determination of the jurisdictional status and delineation of the boundaries of Waters of the United States (WUS) in the project area. The U.S. Army Corps of Engineers (USACE) regulates deposition of fill material into WUS and reserves the ultimate authority in making the final determination of jurisdictional status and boundaries of WUS, including wetlands, under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act (CWA). The State Water Resources Control Board, through Regional Water Quality Control Boards (RWQCB), has been designated with providing oversight of Section 401 of the CWA in California.

1.2 Project Setting

The proposed project occurs within the western portion of TAFB along the southeastern edge of the City of Fairfield in Solano County, California (Figure A-1 [figures located in Appendix A]) within Township 5 North, Range 1 West, Section 21 and Section 22 of the Elmira 7.5 minute USGS quadrangle. TAFB is situated on approximately 5,200 acres of fee-owned land in northern California, approximately 50 miles northeast of San Francisco and 40 miles west of Sacramento (TAFB 2003). TAFB lies east and south of heavily developed portions of Fairfield and Vacaville, California. The base lies north of the Suisun Marsh and west of relatively undisturbed open space areas near State Highway 113.

The proposed terminal will be constructed adjacent to an existing tank terminal and south of Hangar Avenue (Figure A-2) in an area previously used as a waste disposal site by TAFB. The proposed pipeline travels west along an existing, decommissioned railway and connects to an existing SFPP pipeline along the eastern edge of Walters Road (Figure A-2). The entire project area lies within TAFB property including an easement along the railway west of the main base property. The terminal will be a permanent above ground structure and the pipeline will be placed below ground with the exception of a small maintenance area at its western extent (Figure A-2).

Land use activities have significantly affected the structure and composition of natural resources on TAFB. Much of the base is developed and contains impervious surfaces (runways, roads, buildings), as well as lawns and landscaped areas. The remaining undeveloped areas are actively maintained (mowed, disced, grazed, or a combination of these) to limit vegetation growth thereby limiting potential for bird strike hazards to aircraft.

TAFB established five Ecological Preserve Areas as a requirement of a Biological Opinion issued by the US Fish and Wildlife Service, dated 28 May 1999 (TAFB 2003). TAFB established regulations designating them special ecological preserves in perpetuity, for the purpose of conserving regional vernal pool ecosystems and their unique species, and restricting entry and uses to those not conflicting with that purpose (TAFB 2003). Two Ecological Preserves occur in the project area including the area at the northern boundary of the proposed terminal and the one that encompasses the Aero Club at the western boundary of TAFB (Figure A-2). The proposed pipeline travels through this Ecological Preserve within the existing railway right-of-way.

1.2.1 Hydrology

Major watersheds within TAFB are comprised of the western and eastern branch of Union Creek, which diverges approximately one mile north of Travis. The western branch of Union Creek, which flows along the eastern edge of the project area, has been channelized for stormwater drainage for the majority of its route across TAFB. Surface topography in the project area splits east and west at approximately the western edge of the proposed terminal. The terminal, and areas east, flow primarily toward Union Creek while areas west of the terminal primarily flow to the west and southwest along the railway ditches and a seasonal swale that occurs west of the TAFB property (Figure A-3).

The project area occupies a remnant portion of the Solano-Colusa Vernal Pool Region, characterized by periodic alkaline basins surrounded by upland herbaceous-dominant vegetation of the Sacramento Valley (USFWS 2005). The vernal pools at TAFB are included in the Northern Claypan Vernal Pool Series (Sawyer and Keeler-Wolf 1995). Vernal pool hydrology in the project area is determined primarily by timing and amount of rainfall during a season, along with basin topography. The water restrictive layer in these vernal pools is formed by a surface clay layer rather than a duripan type subsurface structure (Williamson et al. 2005). Vernal pool hydrology is controlled by surface water runoff as there is little, if any, connection to groundwater or subsurface flows (Marty pers. com., 2008; McCarten pers. com. 2008; Williamson et al. 2005). Natural surface water flows in most years are limited to instances when pools are at capacity and overland sheet flow exceeds the water holding capacity of individual pools (Hanes and Stromberg 1998 from Department of the Air Force 2007).

1.2.2 Vegetation Types

The western portion of TAFB contains a mixture of developed areas, grasslands, and vernal pool complexes. Historically, the soils in the project area likely supported extensive northern claypan vernal pools. Alterations to surface hydrology related to development and base

operations have led to degradation of these complexes. Native vegetation communities have been altered by the introduction of non-native grasses for grazing purposes and current land management activities including discing and mowing to limit vegetation growth and potential for bird strike hazards (TAFB 2003).

Native vegetation communities persist, however, in segments of the project area. Relatively undisturbed vernal pools that are inundated continuously for long periods of time typically support native plant communities. In contrast, seasonal pools that develop in shallow depressions that are subject to intermittent ponding for short durations may contain some characteristic native vernal pool plants, but the dominant vegetation is often non-native grasses.

1.2.3 Soil Types

TAFB is located on a nearly level to gently rolling terrace where the soils formed in alluvium are derived from sedimentary material (USDA 1977). The primary soil type found in the project area is the Antioch-San Ysidro complex (0-2 percent slope) (AoA) (USDA 1977 and 2008a) (Figure A-4). Terminal construction occurs on AoA soils and Altamont-San Ysidro-San Benito complex soils (2-9 percent slope) (AIC). Pipeline construction passes through primarily AoA soils but also through a segment of San Ysidro sandy loam (0-2 percent slope) (SeA), and small inclusions of Omni clay loam (Om) and Pescadero clay loam (Pc). AoA, Om, and Pc soils are found on the list of hydric soils of California (USDA 2008b).

1.3 Regulatory Setting

The Department of the Army, acting through the USACE, has the authority to permit the discharge of dredged or fill material in WUS under Section 404 of the CWA, and permit work and the placement of structures in navigable WUS under Sections 9 and 10 of the Rivers and Harbors Act (33 CFR 320-332).

CWA regulations (33 CFR 328.3(a)), define WUS as follows:

(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or (iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as WUS under the definition;

(5) Tributaries of WUS;

(6) The territorial seas;

(7) Wetlands adjacent to WUS (other than waters that are themselves wetlands).

Based on the U.S. Supreme Court decision in 2001 in the *Solid Waste Agency of Northern Cook County (SWANCC) v. Corps,* the USACE determined that isolated, intrastate, non-navigable waters could not be regulated under the CWA if there was no link to interstate of foreign commerce (Ruffolo 2002 and USACE 2007).

Based on the U.S. Supreme Court decision in 2006 in *Rapanos v. U.S.* and in *Carabell v. U.S*. (hereafter referred to as *Rapanos),* the USACE provided two new analytical standards for determining whether water bodies that are not traditional navigable waters (TNWs), including wetlands adjacent to those non-TNWs, are subject to CWA jurisdiction: (1) if the water body is relatively permanent (RPW) (has continuous flow at least seasonally), or if the water body is a wetland that directly abuts an RPW, or (2) if a non-RPW, in combination with all wetlands adjacent to that water body, has a significant nexus with TNWs (USACE 2007).

In accordance with *Rapanos* Guidance (USACE 2007), certain geographic features generally are not considered jurisdictional waters:

- swales, erosional features (e.g. gullies) and small washes characterized by low volume, infrequent, and short duration flow;
- ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water; and
- uplands transporting over land flow generated from precipitation (i.e., rain events and snowmelt).

However, ditches that transport relatively permanent (continuous at least seasonally) flow directly or indirectly into TNWs or between two (or more) waters of the U.S., including wetlands, are jurisdictional waters regulated under the CWA (USACE 2007). Swales and ditches may also contribute to a surface hydrologic connection where the features replace or relocate a water of the U.S., connect a water of the U.S. to another water of the U.S., or provide relatively permanent flow to a water of the U.S. (USACE 2007).

Section 401 of the CWA addresses the impact of a project on water quality. A project must comply with Section 401 before the USACE can issue a Section 404 Permit. In California, the Regional Water Quality Control Board (RWQCB) in charge of the project area (San Francisco RWQCB in this case) issues Section 401 Water Quality Certifications or Waivers of Certification, depending upon the extent of impacts to WUS.

2.0 METHODS

Background information was gathered from existing documentation to determine the potential for jurisdictional waters to occur on the property. The information gathered and reviewed included:

- Soil Survey of Solano County, California (USDA 1977) and online version (USDA 2008a);
- Topographic maps (USGS 1980);
- GIS data obtained from Travis AFB including vernal pool delineations performed by:
    - Roy F. Weston, Inc. (1995),
    - Earth Tech (1998 and 2000),
- Site Assessment for California Tiger Salamander (Garcia & Associates 2008);
- Site Assessment for Sensitive Vernal Pool Crustaceans (Garcia & Associates 2008);
- Rare Plant Survey Report (Restoration Resources 2008); and
- Integrated Natural Resource Management Plan (TAFB 2003).

An initial site visit was conducted by AMEC biologist Nick Ricono on March 19, 2008 along with Vernal Pool Fairy Shrimp permit holder Rob Aramello and California Tiger Salamander permit holder Kevin Wiseman of Garcia and Associates. Information on topography and habitat associations was collected for analysis prior to delineation. Data used in this preliminary delineation and jurisdictional determination was collected by Mr. Ricono on April 24, 2008, upon returning to the site with botanist Niall McCarten of Restoration Resources, who was conducting rare plant surveys. Wetland delineations were conducted using methods described in the USACE Wetland Delineation Manual (1987) and the Interim Arid West Regional Wetland Delineation Supplement (USACE 2006). The project area was defined as the proposed terminal area and pipeline route along the existing railway line and included 250 foot buffer around the proposed locations. Existing fence lines along the railway line provided a limitation for direct survey of the entire buffer area based on private property limitations. Therefore, assessments of areas outside existing fence lines along the railway line were observational in the field, made through examination of existing GIS data collected from TAFB, and interpretation of recent high quality aerial photographs.

The wetland delineation was conducted according to the procedures for a “routine determination” because the property displays relatively naturalized hydrogeomorphic characteristics. There have been major alterations to surface hydrology in the project area from TAFB activities including the construction of the railway line and activities related to the waste dump site at the proposed terminal location. However, these alterations occurred decades ago, allowing for naturalized surface hydrology conditions in the project area.

Field observations included indicators of wetland hydrology, hydrophytic vegetation, and hydric soils within the project area. Sample Point locations were selected based on the visual presence of bio-hydrogeomorphic characteristics across the project area. Wetland Data

Forms from the Arid West Regional Wetland Delineation Supplement were used to document data collected at sample locations (Appendix B).

Plants were identified to species using the Jepson Manual: Higher Plants of California (Hickman 1993). The National List of Plant Species that Occur in Wetlands (Reed 1988) was used to determine the wetland indicator status of the plants. Dominant species were assessed using the recommended “50/20” rule as recommended in the 1987 Manual and 2006 Interim Manual. Plant species were classified as obligate wetland (OBL) with greater than 99 percent probability of occurring in wetlands; facultative wetland (FACW) with 67 percent to 99 percent probability of occurring in wetlands; facultative (FAC) with 33 percent to 67 percent probability of occurring in wetlands; facultative upland (FACU) with 1 percent to 33 percent probability of occurring in wetlands; or upland (UPL) with less than 1 percent probability of occurring in wetlands.

The site was investigated to determine the presence of primary or secondary wetland hydrology indicators including inundation, saturation, water marks, surface soil cracks, salt or biotic-crust, drainage patterns, etc.

Based on the fact that northern clay pan vernal pools are almost entirely affected by surface water hydrology, soil pits were reduced in depth to approximately 6-inches to limit damage to the surface clay layer and allow for observation of soil characteristics instead of groundwater related hydrology. Soil profiles were examined for color and texture using a Munsell Soil Color Chart (2000). Hydric soil characteristics were identified in the field such as sulfidic odor, low chroma colors, and the presence of redoximorphic features.

Wetland boundaries identified during field investigations were delineated using a Trimble Geo XT Global Positioning System (GPS) with sub meter accuracy. The data were then exported to GIS and overlaid onto orthorectified aerial photographs with 0.25 feet per pixel accuracy (UDI-TETRAD Consulting Engineers, Inc. 2008). Delineation of wetland boundaries outside of areas of direct data collection were obtained from a combination of existing TAFB GIS layers from delineations conducted on base by Roy F. Weston (1998) and Earth Tech (1998 and 2000) and from direct observation in the field and aerial photo interpretation.

The preliminary determination of the extent of USACE jurisdiction on the subject property is based on definitions of WUS, wetlands, and ordinary high water mark (OHWM) (USACE 1987 and 2006). Additional information on jurisdictional status was obtained from USACE guidance documents on *SWANCC* and the *Rapanos* decisions (USACE 2007). Jurisdictional Determination Forms were filled out for the project area per USACE (2007) guidance and included in Appendix C.

3.0 RESULTS

3.1 Site Description

The terminal and pipeline project as proposed will occur in the western portion of TAFB in a historical waste disposal site southwest of an existing tank terminal facility; and along an existing railway that extends west of Hangar Avenue through TAFB property and within a property easement west of TAFB to Walters Road (Figure A-2). The extent and distribution of jurisdictional waters, including wetlands, on the subject property is represented in Figure A-5. General surface water hydrology in the project area is identified in Figure A-5 based on topographic maps (USGS 1980) and a digital terrain surface model produced by Autocad Land Desktop (UDI-TETRAD Consulting Engineers, Inc. 2008).

3.1.1 Proposed Terminal

The proposed terminal (Figure A-6) lies in a location that was historically used as a waste disposal site by TAFB. The topography of the site slopes from approximately 85 feet (ft) above mean sea level (MSL) in the southern extent to approximately 56 ft above MSL in the northeastern corner of the proposed terminal. The area is heavily disturbed and composed of a mixture of native and nonnative upland vegetation and bare ground mixed with broken concrete and asphalt material. A vernal pool complex lies north of the proposed terminal in an area designated as an Ecological Preserve by TAFB and identified by fencing and signage. A raised concrete berm (Figure A-6) was constructed by TAFB along the southern and western edge of this vernal pool complex to separate it from the former dump site due to potential for sedimentation impacts. Potential vernal pools were identified along the entry road to the former dump site where raised road beds provide for water accumulation. General hydrology in this area flows to the north and east toward Union Creek which lies east of the proposed terminal (Figure A-5). Topography along the railway line north of the proposed terminal splits at approximately the western extent of Hangar Avenue (61 ft above MSL) flowing west and east from that point (Figure A-5).

Potential vernal pools were identified south of the proposed terminal where hydrology flows to the south beyond the southern edge of the terminal. One potential vernal pool was identified west of the proposed terminal adjacent to an existing railway spur (Figure A-5). Hydrology in this area follows the railway spur to the north and west (Figure A-5).

3.1.2 Proposed Pipeline Route

An existing, decommissioned railway runs east to west at the northern border of Hangar Avenue, to the north of the proposed terminal. The railway line runs to the west, through an Ecological Preserve that was established around the Aero Club facility (Figure A-7), past the TAFB property line through a TAFB easement, to Walters Road (Figure A-8). Ballast, ties, and track remain on the decommissioned railway and vary in elevation from approximately 2 to 4 ft above the surrounding landscape. Drainage ditches run the length of the railway on the north and south edges of the ballast, flowing through multiple culverts primarily to the west. Surface flow regimes are based on microtopography in the western TAFB, however,

the general trend through the TAFB Ecological Preserve including the Aero Club and area west of the property line is from northeast to southwest (Figure A-5).

3.2 Habitat Types

Generally, the project area can be divided into six vegetation community types described below including dominant vegetation with wetland indicator status based on Reed (1988):

- **Riparian**
  This community type is restricted entirely to the constructed channel of the west branch of Union Creek. The steep banks and bed of the channel are dominated by small willows (*Salix* sp.) (FACW to OBL) and cattail (*Typha* sp.) (OBL).

- **Developed and Disturbed**
  This community type is found in developed areas, along roadways, within areas of the waste disposal site where concrete and asphalt lie exposed, and along existing railway spurs where ballast, ties, and track create a 2 to 4 ft topographical elevation change from the surrounding landscape. These areas are mostly unvegetated, however sparse vegetation exists in areas and includes spring vetch (*Vicia sativa*) (UPL), and ripgut brome (*Bromus diandrus*) (UPL).

- **Eucalyptus Woodland**
  A small pocket of mature bluegum eucalyptus (*Eucalyptus globulus*) (UPL) occurs in the northeastern corner of the proposed terminal.

- **Upland Annual Grassland**
  This community type occurs in upland vegetated areas and is dominated by introduced annual grasses associated with grazing, along with occurrences of non-native and native forbs, and small shrubs. Dominant species in this community include ripgut brome, rat-tail fescue (*Vulpia myuros*) (FACU), wild oat (*Avena fatua*) (UPL or FACU), filaree (*Erodium botrys*) (UPL), and sparse coyote brush (*Baccharis pilularis*) (UPL).

- **Non-Native Grass Seasonal Swales**
  This community type is found in shallow depressional areas primarily along the drainage ditches that follow along the north and south side of the railway line. These ditches were constructed during installation of the railway and are designed to carry flows primarily to the west. They hold water for short periods of time relative to active vernal pools and are dominated by foxtail barley (*Hordeum jubata*) (FAC), perennial ryegrass (*Lolium perenne*) (FAC), ripgut brome, filaree and wild oat. The overall habitat quality and species diversity are generally low in these areas relative to true vernal pool habitats.

- **Vernal Pools and Swales**
  This community type is found in extant and remnant vernal pools within and adjacent to the project area and is dominated by native annual plants characteristic of northern

claypan vernal pools (Sawyer and Keeler-Wolf 1995). These areas typically occur where the basin topography is pronounced and surface water is allowed to pool for extended periods of time. Several pools and swales were sparsely vegetated and covered with a filamentous algae crust. However, dominant vegetation in most pools included coyote thistle (*Eryngium vaseyi*) (FACW), popcorn flower (*Plagiobothrys stipitatus micranthus*) (OBL), semaphore grass (*Pleuropogon californicus*) (OBL), horned downingia (*Downingia ormatissima*) (OBL), common spikerush (*Eleocharis macrostachya*) (OBL), wolly marbles (*Psilocarphus brevissimus*) (OBL), smooth goldfields (*Lasthenia glaberrima*) (OBL), and Contra Costa goldfields (*Lasthenia conjugens*) (FACW).

3.3 Sample Points

Vegetation, soil, and hydrology data was collected at 18 Sample Points in the project area and is represented in Wetland Determination Data Forms for the Arid West Region in Appendix B. Sample Point locations are represented in Figure A-5, A-6, A-7, and A-8. Sample Point 1 represents upland areas common to the historical dump site proposed for use in construction of the terminal facility. Sample Points 2, 3, 4, 5 and 7 are representative of depressional areas surrounding the terminal facility that collect and hold water for extended periods of time. Sample Point 6 is representative of an upland area adjacent to a vernal pool near the proposed terminal. Sample Point 8 and 18 are representative of the railway drainage ditch community through the majority of the route from Hangar Road to Walters Road. Sample Points 10, 11, 13, 14, 15, and 17 are representative of higher quality vernal pool habitat within the railway drainage ditch that results from extensions of larger vernal pool complexes north and south of the railway right-of-way into the ditch segments. Sample Points 9, 12 and 16 were collected in upland areas south of the southern railway drainage ditch and are representative of the adjacent upland community.

The project area contains “problematic soils” described as “Seasonally Ponded Soils” in the Interim Arid West Regional Supplement to the Wetland Delineation Manual (USACE 2006). This determination was based on review of soil series information found in the Soil Survey of Solano County (USDA 1977) and the National Hydric Soils List for the state of California (USDA 2008b), and by field characteristics identified during the survey. Based on the fact that northern claypan vernal pools in western TAFB have little interaction with subsurface water tables, hydrology determinations were primarily based on surface topography and primary indicators such as water marks, drift deposits, surface soil cracks, and biotic crusts. Wetland determinations were made primarily on the presence of surface hydrology and a predominance of hydrophytic vegetation.

3.4 Wetlands

Wetlands were identified in Union Creek to the east of the proposed terminal. Wetlands associated with vernal pools and swales were identified in the vicinity of the proposed terminal (Figure A-6). The drainage ditches along the north and south sides of the railway (Figure A-7 and A-8) were determined to be non-wetland based on vegetation composition (50 percent or less FAC or wetter species) with the exception of locations where higher

quality vernal pools north and south of the railway line encroach into the railway right-of-way and associated drainage ditches or flow through the right-of-way through culverts. This study identified 11.17 acres of wetland and 1.18 acres of non-wetland (railway drainage ditch) WUS in the study area.

3.5 Jurisdictional Status

Jurisdictional Determination Forms were filled out for the project area per USACE (2007) guidance and included in Appendix C. Final determination of jurisdictional status may only be made by the USACE. The following information provides a preliminary assessment of the extent and distribution of jurisdictional waters, including wetlands, on the subject property based on information described in this document and represented in Figure A-5.

- Union Creek (Figure A-6) would most likely be considered a jurisdictional WUS, including wetlands, because it is a relatively permanent waterway (RPW) (has continuous flow at least seasonally) and has a surface water connected to a traditionally navigable water (TNW) (Suisun Marsh) at the southern extent of TAFB.
- Vernal pools that have a surface water connection to Union Creek (those north and south of the proposed terminal) (Figure A-6) would likely be considered jurisdictional WUS as either wetlands adjacent to an RPW, or as RPWs themselves with a surface water connection to a TNW.
- The vernal swale that crosses the railroad right-of-way west of TAFB boundary (Sample Point 14, Figure A-5) would likely be considered jurisdictional WUS as an RPW connected to a TNW (Suisun Marsh).
- Vernal pools north and south of the railway line in the Ecological Preserve associated with the Aero Club, and vernal pools within private property north and south of the railroad ROW west of TAFB, would likely be considered jurisdictional WUS as either wetlands adjacent to an RPW (vernal swale at Sample Point 14, Figure A-5), or as RPWs themselves with a surface water connection to a TNW (connected through the drainage ditches along the north and south sides of the railroad).
- The drainage ditches themselves could be considered jurisdictional WUS (non-wetland) as they contribute to a surface hydrologic connection where the features replace or relocate a WUS or connect a WUS (vernal pools) to another WUS (vernal swale at Sample Point 14, Figure A-5) (USACE 2007).
- Railway drainage ditches at the western extent of the proposed pipeline route flow into the roadside ditch at Walters Road which eventually feeds into Belmont Creek and the Suisun Marsh several miles downstream. These railroad drainage ditches, therefore, could be considered jurisdictional WUS (non-wetland) as they contribute to a surface hydrologic connection where the features replace or relocate a WUS or connect a WUS (vernal pools) to another WUS (Suisun Marsh) (USACE 2007).

4.0 CONCLUSION AND RECOMMENDATION

The purpose of this report is to facilitate compliance with Section 404 of the CWA for impacts to jurisdictional waters from construction of the JP8 Fuel Pipeline and Terminal at TAFB.

The project area was defined as the proposed terminal area and pipeline route along the existing railway line and included 250 foot buffer around the proposed locations. The project area contains surface hydrological features including a perennial stream, a seasonal swale, vernal pools, and railroad drainage ditches that transport surface waters to the east and to the west based on topography.

- Waters flowing to the east flow into Union Creek at the eastern edge of the proposed terminal. Union Creek is a perennial waterway that transports water south to the edge of TAFB and enters the Suisun Marsh through Hill Slough approximately 4 stream miles south of the project area. Suisun Marsh which includes tidal wetlands adjacent to traditionally navigable waters (TNWs) that extend from the Carquinez Straight to Suisun City.
- Waters flowing to the west along the railroad drainage ditch flow into a vernal swale that could be considered an intermittent stream (with continuous flow at least seasonally) that transports water south through residential areas, to the Suisun Marsh through Hill Slough approximately 2.4 miles south of the junction with the railroad ditch.
- Waters flowing further to the west along the railroad drainage ditch flow into a roadside ditch along Walters Road. The roadside ditch eventually flows underground through residential areas and likely outlets into Belmont Creek to the west, which enters the Suisun Marsh through Hill Slough approximately 2.6 miles south of the junction with the railroad ditch.

Vernal pools and railroad drainage ditches in the project area that have surface water connections to those three relatively permanent waterways could be considered jurisdictional WUS.

4.1 Impact Assessment

Proposed pipeline and terminal construction areas are identified in Figures D-1 through D-10 (Appendix D).

The proposed pipeline construction methods will incorporate standard open cut trenching methods along the southern extent of the existing railway line with use of boring methods (horizontal directional drill, jack and bore, or slick bore) to avoid surface impacts to swales and vernal pool complexes that transport water from the north side of the tracks to the south (Figures D-1 through D-9). Therefore, impacts to jurisdictional WUS will be temporary and related to soil stockpile in the south railroad drainage ditch only. Pre-construction contours will be restored upon project completion and the ditch will be revegetated to eliminate erosion in downstream areas.

The proposed construction footprint of the terminal has been designed to avoid permanent and temporary impacts to all jurisdictional waters in the project area (Figure D-10).

Permanent impacts to WUS proposed for the project are limited to the western edge of the project area (Figure D-1) where the Travis Junction will be constructed over the southern railroad ditch permanently impacting 0.009 acres of WUS. Flow in the southern drainage ditch will be rerouted through a culvert to the northern drainage ditch which flows into the roadside ditch at Walters Road.

The following table described temporary and permanent impacts related to the proposed project.

Table 1. Temporary and Permanent Impacts to Jurisdictional Waters Related to the Proposed JP 8 Fuel Pipeline and Terminal at Travis Air Force Base

Impact Area	Temporary Impacts to WUS (acres)	Permanent Impacts to WUS (acres)
Drainage Ditch along Existing Railway	0.328	0.009

WUS – Waters of the United States under Section 404 of the Clean Water Act

4.2 Regulatory Requirements

The deposition of dredge or fill material into WUS is regulated by the USACE under Section 404 of the CWA. The project occurs entirely within TAFB property (including an easement along the existing railroad) and, therefore, requires application of federal regulations only. Nationwide Permit (NWP) 12 applies to activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in WUS provided the activity does not result in the (permanent) loss of greater than 0.5 acres of WUS, and there is no change in pre-construction contours. No activity is authorized under any NWP which “may affect” a listed species or critical habitat, unless Section 7 consultation has been completed. Because there are potentially listed species and critical habitat within, or in close proximity to the project area, TAFB is progressing through Section 7 consultation with U.S. Fish and Wildlife Service (USFWS). Federal permittees must provide the USACE with the appropriate documentation to demonstrate compliance with those requirements. Notification should be provided to USACE for use of NWP 12 and should include correspondence with USFWS.

The project will require separate Water Quality Certification from the RWQCB under Section 401 of the CWA. A permit application should be submitted to initiate that process.

The Applicant for a Section 404 permit (according to 2008 USACE Regulatory Guidance Letter No. 08-02) can elect to request and obtain an “Approved JD” (i.e., have this Preliminary JD reviewed and approved by USACE staff) or can decline to request an Approved JD, and instead obtain a USACE permit authorization based on a preliminary JD.

A definitive, official determination that there are, or that there are not, jurisdictional WUS on a site can only made by an Approved JD. A Preliminary JD can only be used to determine that wetlands or other water bodies that exist on a particular site “may be” jurisdictional WUS. A Preliminary JD cannot be used to determine either that there are no wetlands or other water bodies on a site at all, or that only a portion of the wetlands or waterbodies on a site are jurisdictional. Therefore, if this Preliminary JD is used for permitting purposes without an Approved JD, all temporary and permanent impacts to waters would be considered impacts to WUS. The total temporary impact area would, therefore, be 0.337 acre and total permanent impact would remain 0.009 acre.

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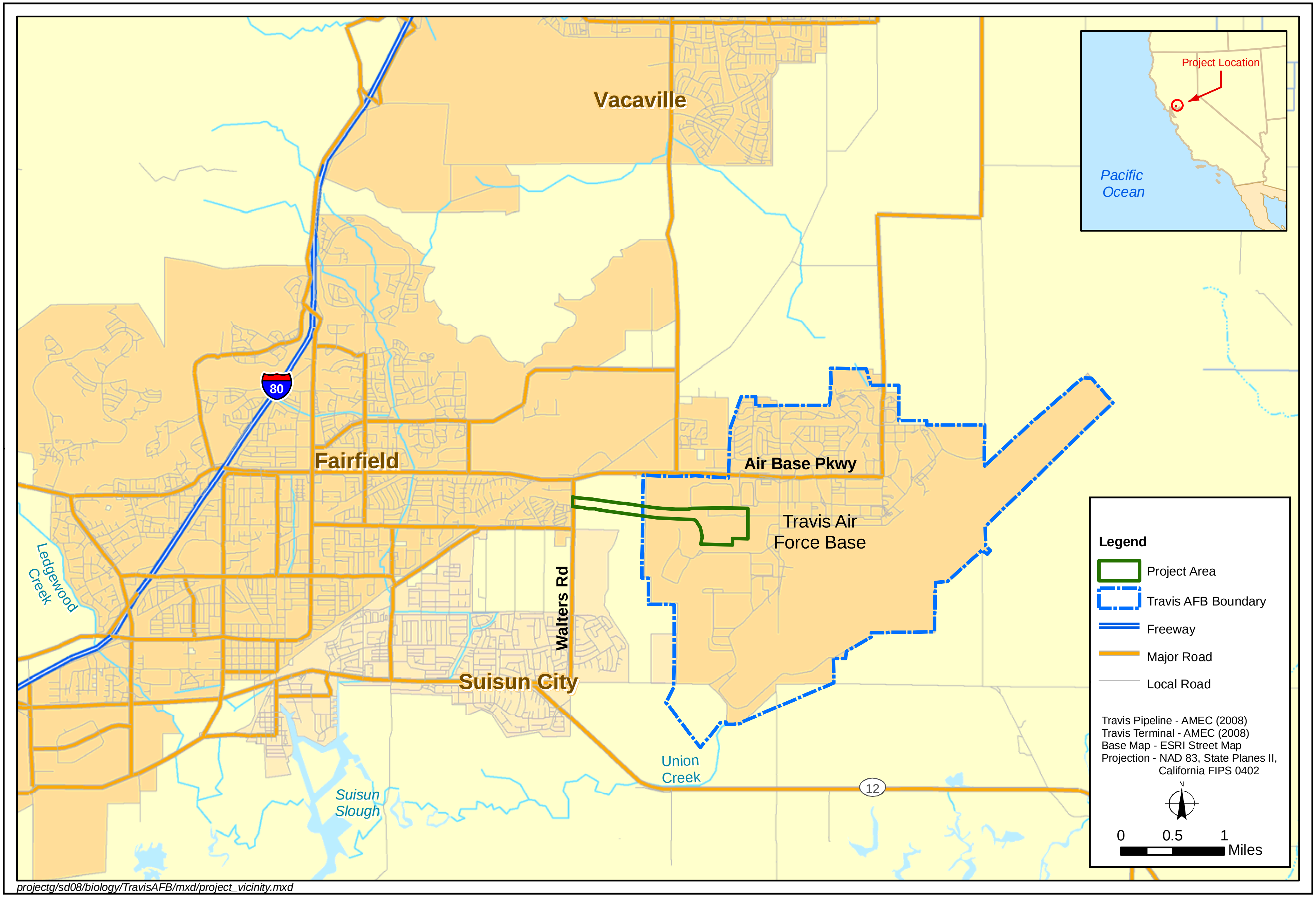
Appendix A
Figures



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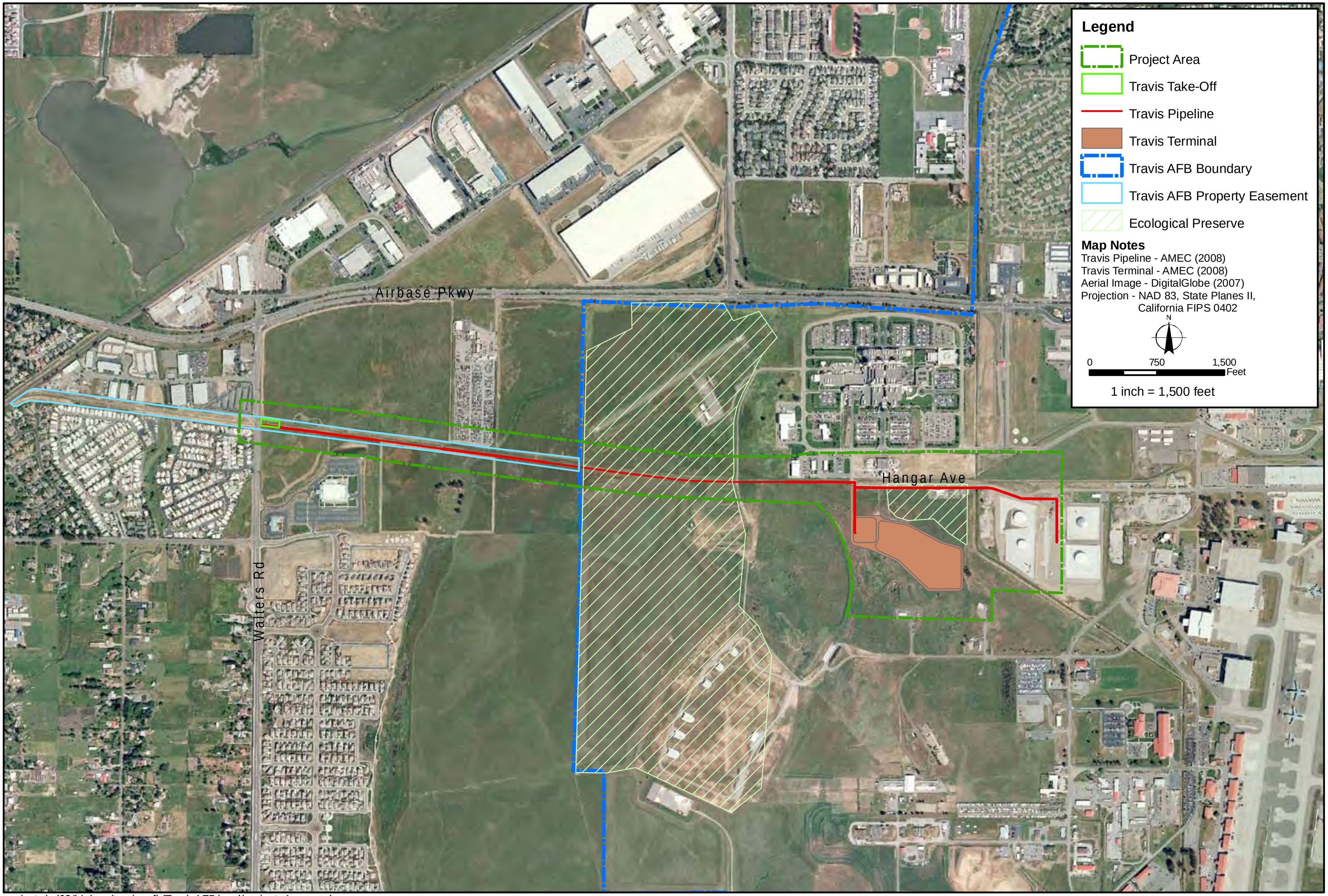
amec

Project Vicinity
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-1



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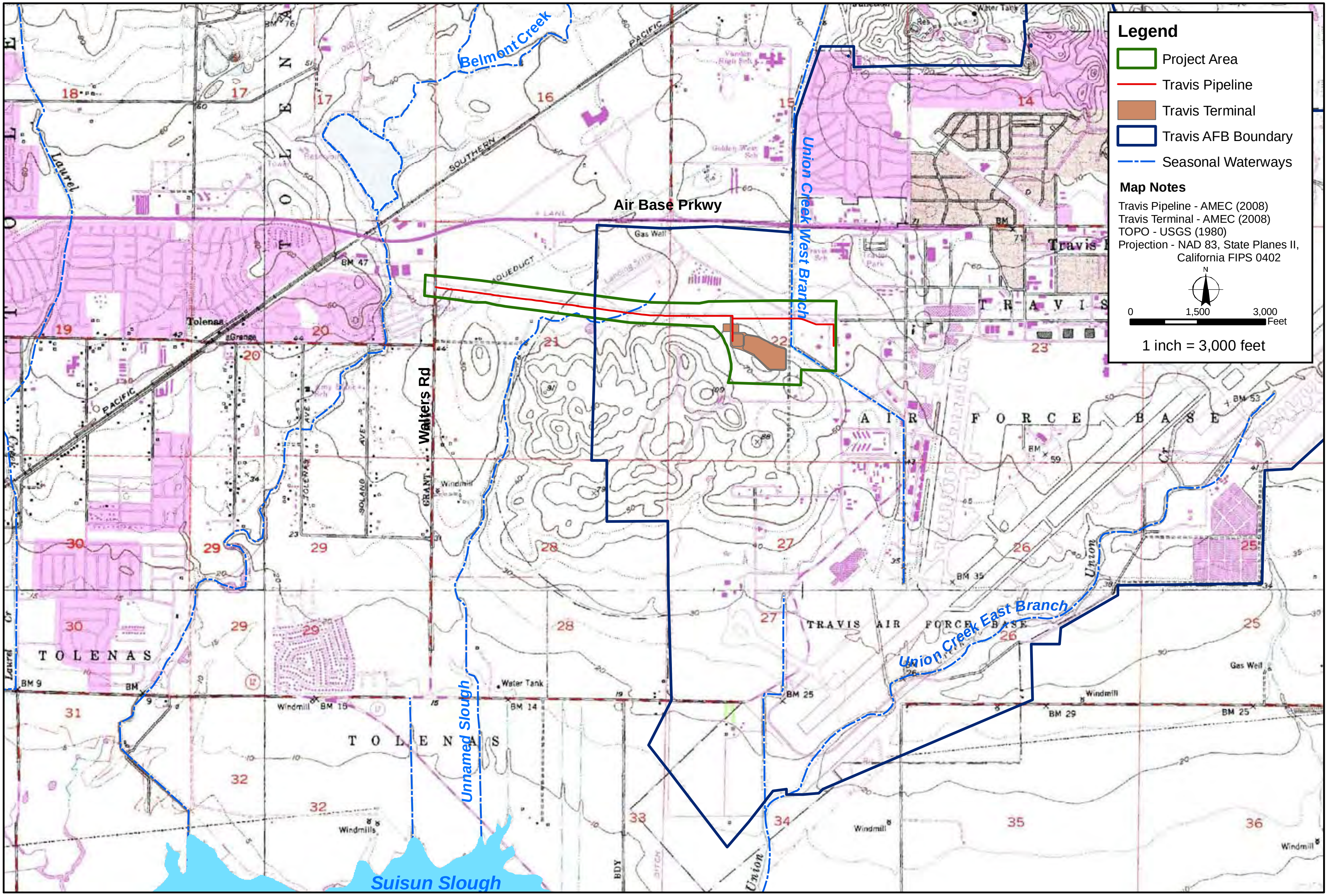
Project Area
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-2



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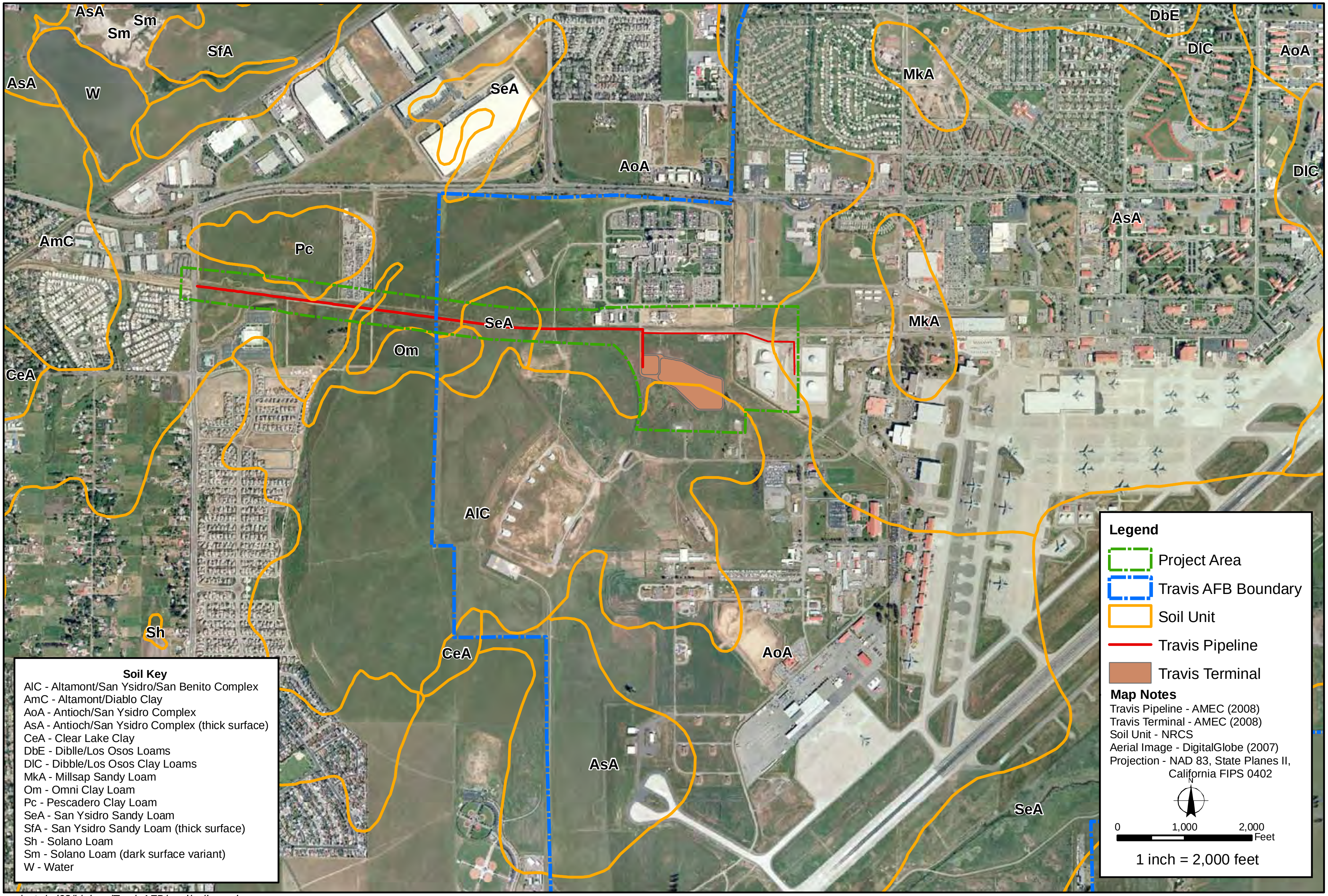
amec

Topographic Representation (USGS 1980)
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-3



projectg/sd08/biology/TravisAFB/mxd/soils.mxd

Soil Survey
JP8 Fuel Pipeline and Terminal at Travis AFB

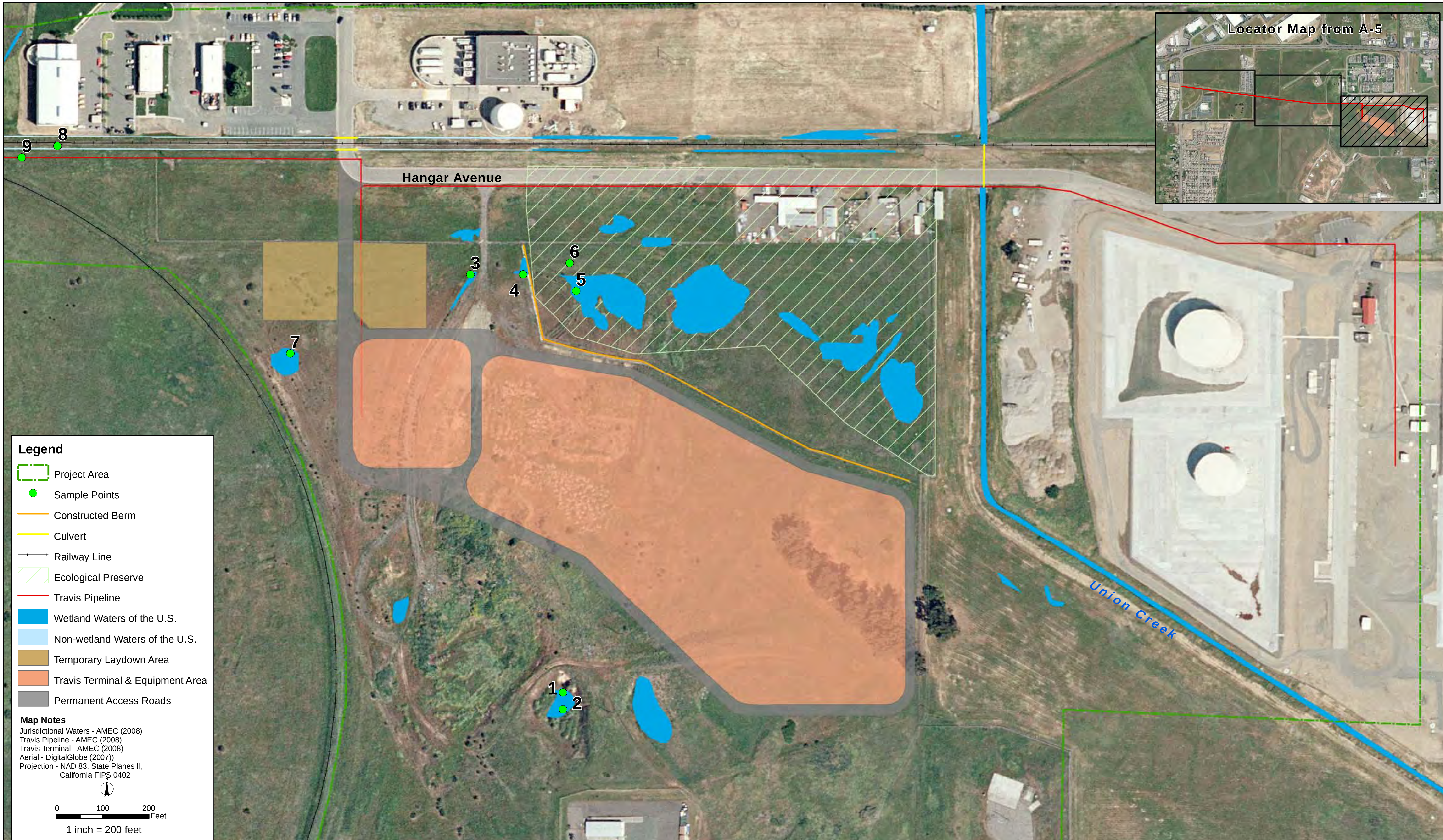
FIGURE
A-4

Path:/Kitts/Proposal/08/TravisAFB/mxd/waters.mxd

amec

Jurisdictional Waters and Wetlands
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-5



projectg/sd08/biology/TravisAFB/mxd/waters_tank.mxd

amec

Jurisdictional Waters and Wetlands in the Travis Terminal Area
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-6

projectg/sd08/biology/TravisAFB/mxd/waters_tank_a7.mxd

amec

Jurisdictional Waters and Wetlands along Pipeline Route
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-7

projectg/sd08/biology/TravisAFB/mxd/waters_tank_a8.mxd

amec

Jurisdictional Waters and Wetlands along Pipeline Route
JP8 Fuel Pipeline and Terminal at Travis AFB

FIGURE
A-8

Appendix B
Data Forms from the Arid West Regional Wetland Delineation Supplement

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 1

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): sloping south Slope (%): 4

Subregion (LRR): ______ Lat: N 38° 15' 48.61" Long: W 121° 57' 47.95" Datum: ______

Soil Map Unit Name: Altamont-San Ysidro-San Benito 2-9% slope) NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes ____	No X	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____ **No** X

Remarks:
Sample site lies along a hillside that slopes into a concave area. Area lies in historical dump site but has naturalized with lack of activity for several years.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Baccharis pilularis	5	Yes	UPL
2.			
3.			
4.			
5.			
Total Cover:	5		
Herb Stratum			
1. Bromus diandrus	70	Yes	UPL
2. Erodium botrys	25	Yes	NI
3. Vulpia myuros	5	No	FACU
4. Avena fatua	5	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	105		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
10	10YR 5/4	95	7.5 YR 5/8	5	C	M	S-L-C	Sand with loam & clay stringer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____Histosol (A1)
____Histic Epipedon (A2)
____Black Histic (A3)
____Hydrogen Sulfide (A4)
____Stratified Layers (A5) (**LRR C**)
____1 cm Muck (A9) (**LRR D**)
____Depleted Below Dark Surface (A11)
____Thick Dark Surface (A12)
____Sandy Mucky Mineral (S1)
____Sandy Gleyed Matrix (S4)
____Sandy Redox (S5)
____Stripped Matrix (S6)
____Loamy Mucky Mineral (F1)
____Loamy Gleyed Matrix (F2)
____Depleted Matrix (F3)
____Redox Dark Surface (F6)
____Depleted Dark Surface (F7)
____Redox Depressions (F8)
____Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____1 cm Muck (A9) (**LRR C**)
____2 cm Muck (A10) (**LRR B**)
____Reduced Vertic (F18)
____Red Parent Material (TF2)
____Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes**_______ **No** X_______

Remarks:
Soils are most likely not native to the area and/or disturbed based on historical use of the area as a dump site and the presence of concrete and ashpault debree in lower elevations.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___Surface Water (A1)
___High Water Table (A2)
___Saturation (A3)
___Water Marks (B1) (**Nonriverine**)
___Sediment Deposits (B2) (**Nonriverine**)
___Drift Deposits (B3) (**Nonriverine**)
___Surface Soil Cracks (B6)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leaves (B9)
___Salt Crust (B11)
___Biotic Crust (B12)
___Aquatic Invertebrates (B13)
___Hydrogen Sulfide Odor (C1)
___Oxidized Rhizospheres along Living Roots (C3)
___Presence of Reduced Iron (C4)
___Recent Iron Reduction in Plowed Soils (C6)
___Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___Water Marks (B1) (**Riverine**)
___Sediment Deposits (B2) (**Riverine**)
___Drift Deposits (B3) (**Riverine**)
___Drainage Patterns (B10)
___Dry-Season Water Table (C2)
___Thin Muck Surface (C7)
___Crayfish Burrows (C8)
___Saturation Visible on Aerial Imagery (C9)
___Shallow Aquitard (D3)
___FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes**_____ **No** X____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Area upland of depressional pool.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 2

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): Hill top depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 15' 48.26" Long: W 121° 57' 47.99" Datum: ______

Soil Map Unit Name: Altamont-San Ysidro-San Benito 2-9% slope) NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___		
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X	No ___	**within a Wetland?**	**Yes** X **No** ___

Remarks:
Sample site lies within depression at the base of a slope. Area lies in historical dump site but has naturalized with lack of activity for several years.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasiolepis	15	Yes	FACW
2.			
3.			
4.			
Total Cover:	15		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	5		
Herb Stratum			
1. Plagiobothrys stipitatus micranthus	30	Yes	OBL
2. Eleocharis macrostachya	30	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	60		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL Sampling Point:_________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 4/2	50	7.5 YR 4/6	50	C	M	S-C	Sandy clay, oxidized root chan

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
X Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:________________
Depth (inches): ____________

Hydric Soil Present? **Yes** X **No**____

Remarks:
Soils are most likely not native to the area but do not appear to have been recently disturbed. Pool holds approximatley 34 inches of water for several weeks per year.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
x Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes____ No X Depth (inches): ______
Water Table Present? Yes____ No X Depth (inches): ______
Saturation Present? Yes____ No X Depth (inches): ______ **Wetland Hydrology Present?** **Yes** X **No**____
(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
During previoius inspection on 3/19/08, there was approximately 30 inches of standing water inside the pool.

Remarks:
Depressional area includes vernal pool vegetation and hydric soils. The pool likely holds water for several weeks each year.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 3

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 15' 57.61" Long: W 121° 57' 50.36" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____

Remarks:
Sample site lies within a constructed swale at the edge of a roadway. Water flows from south to north and collects at the low point of the swale.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Plagiobothrys stipitatus micranthus	30	Yes	OBL
2. Lasthenia conjugens	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	50		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

____ Prevalence Index is ≤3.0

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/4	70	10 YR 5/8	10	C	M	C	Dry clay soil
			10 YR 7/1	20	D	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
X___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Soils occur in a constructed swale adjacent to a roadway but do not appear to have been recently disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X_ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Constructed roadside swale contains vernal pool vegetation and clay soils. Deeper portions most likely hold water for extended periods.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 4

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 15' 57.65" Long: W 121° 57' 48.95" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	**Yes** X **No** ___

Remarks:
Sample site lies within a depression that lies against a constructed berm that is meant to separate historical dump site from Ecological Preserve containing high quality vernal pools.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Plagiobothrys stipitatus micranthus	30	Yes	OBL
2. Lasthenia conjugens	20	Yes	FACW
3. Eryngium vaseyi	10	No	FACW
4.			
5.			
6.			
7.			
8.			
Total Cover:	60		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL Sampling Point:_________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/4	70	10 YR 5/8	10	C	M	C	Dry clay soil mixed with grave
			10 YR 7/1	20	D	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
X ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:____________________
Depth (inches): ____________________

Hydric Soil Present? **Yes** X_____ **No**______

Remarks:
Soils lie in disturbed, depression adjacent to a constructed concrete berm.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X_ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No X____ Depth (inches): __________
Water Table Present? Yes_____ No X____ Depth (inches): __________
Saturation Present? Yes_____ No X____ Depth (inches): __________
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding in depression is related to constructed berm and clay soils. Contains verlan pool vegetation and most likely holds water for extended periods.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 5

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 15' 57.40" Long: W 121° 57' 47.54" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Areas within a Wetland?**	**Yes** X **No** ___
Hydric Soil Present?	Yes X No ___		
Wetland Hydrology Present?	Yes X No ___		

Remarks:
Sample site lies within a vernal pool located within a fenced Ecological Preserve.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Plagiobothrys stipitatus micranthus	30	Yes	OBL
2. downingia ornatissima	25	Yes	OBL
3. Eryngium vaseyi	15	Yes	FACW
4. Lasthenia conjugens	5	No	FACW
5.			
6.			
7.			
8.			
Total Cover:	75		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/2	70	10 YR 5/8	10	C	M	C	Dry clay soil
			10 YR 7/1	20	D	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
X___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X__ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
X__ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
X__ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? Yes_____ No X____ Depth (inches): ____________ **Wetland Hydrology Present?** **Yes** X____ **No**_____
(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:
During previoius inspection on 3/19/08, there was approximately 10 inches of standing water inside the pool.

Remarks:
Pool is part of a vernal pool complex with surface hydrology flowing to the east toward Union Creek.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 6

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 15' 58.15" Long: W 121° 57' 48.37" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X		
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Areas within a Wetland?**	**Yes** ___ **No** X
Wetland Hydrology Present?	Yes ___	No X		

Remarks:
Sample site lies adjacent to, but outside of the boundaries of the vernal pool sampled in Point 5. Potentially hydric soils but vegetation composition and hydrology do not indicate wetland.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Hordeum jubata	25	Yes	FAC
2. Lolium perenne	30	Yes	FAC
3. Bromus diandrus	30	Yes	UPL
4. Avena fatua	25	Yes	FACU
5.			
6.			
7.			
8.			
Total Cover:	110		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/4	70	10 YR 5/8	10	C	M	C	Dry clay soil
			10 YR 7/1	20	D	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____Histosol (A1)
____Histic Epipedon (A2)
____Black Histic (A3)
____Hydrogen Sulfide (A4)
____Stratified Layers (A5) (**LRR C**)
____1 cm Muck (A9) (**LRR D**)
____Depleted Below Dark Surface (A11)
____Thick Dark Surface (A12)
____Sandy Mucky Mineral (S1)
____Sandy Gleyed Matrix (S4)
____Sandy Redox (S5)
____Stripped Matrix (S6)
____Loamy Mucky Mineral (F1)
____Loamy Gleyed Matrix (F2)
____Depleted Matrix (F3)
____Redox Dark Surface (F6)
____Depleted Dark Surface (F7)
____Redox Depressions (F8)
____Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____1 cm Muck (A9) (**LRR C**)
____2 cm Muck (A10) (**LRR B**)
____Reduced Vertic (F18)
____Red Parent Material (TF2)
____Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Soils potentially hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___Surface Water (A1)
___High Water Table (A2)
___Saturation (A3)
___Water Marks (B1) (**Nonriverine**)
___Sediment Deposits (B2) (**Nonriverine**)
___Drift Deposits (B3) (**Nonriverine**)
___Surface Soil Cracks (B6)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leaves (B9)
___Salt Crust (B11)
___Biotic Crust (B12)
___Aquatic Invertebrates (B13)
___Hydrogen Sulfide Odor (C1)
___Oxidized Rhizospheres along Living Roots (C3)
___Presence of Reduced Iron (C4)
___Recent Iron Reduction in Plowed Soils (C6)
___Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___Water Marks (B1) (**Riverine**)
___Sediment Deposits (B2) (**Riverine**)
___Drift Deposits (B3) (**Riverine**)
___Drainage Patterns (B10)
___Dry-Season Water Table (C2)
___Thin Muck Surface (C7)
___Crayfish Burrows (C8)
___Saturation Visible on Aerial Imagery (C9)
___Shallow Aquitard (D3)
___FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? Yes_____ No X____ Depth (inches): ____________ **Wetland Hydrology Present?** **Yes**_____ **No** x____
(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Site is not likely inundated but provides surface runoff to vernal pool complex.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 7

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 15' 56.15" Long: W 121° 57' 54.97" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___		
Hydric Soil Present?	Yes X No ___	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?**	**Yes** X **No** ___

Remarks:
Sample site lies in small depressional area in relatively flat site east of existing railway line.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Plagiobothrys stipitatus micranthus	20	Yes	OBL
2. Psilocarphus brevissimus	40	Yes	OBL
3. Lasthenia conjugens	15	No	FACW
4. Downingia ornatissima	15	No	OBL
5. Eryngium vaseyi	10	No	FACW
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/4	70	10 YR 5/8	10	C	M	C	Dry clay soil
			10 YR 7/1	20	D	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
X Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X **No**________

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
X Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X Depth (inches): ____________
Water Table Present? Yes_____ No X Depth (inches): ____________
Saturation Present? Yes_____ No X Depth (inches): ____________ **Wetland Hydrology Present?** **Yes** X **No**_____
(includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 8

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 00.34" Long: W 121° 58' 00.64" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		X
Hydric Soil Present?	X	
Wetland Hydrology Present?	X	

Is the Sampled Areas within a Wetland? **Yes** ____ **No** X

Remarks:
Sample site lies within drainage ditch constructed along southern edge of existing railway. Area is previously disturbed but has had little disturbance in several years and hydrology/vegetation has most likely naturalized. Surface water flow is to the west.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Bromus diandrus	15	Yes	UPL
2. Lolium perenne	20	Yes	FAC
3. Hordeum jubata	20	Yes	FAC
4. Erodium botrys	15	Yes	UPL
5. Avena fatua	5	No	UPL
6.			
7.			
8.			
Total Cover:	75		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ____ Dominance Test is >50%
- ____ Prevalence Index is ≤3.0
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:
Bottom of ditch contains bare ground covered with a filamentous algal mat.

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 4/2	80	2.5 YR 3/6	20	C	M	C	Common, fine, distinct mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Problem soils in the project area with extensive histoical clay pan vernal pool complexes. Soils of the Antioch-San Ysidro complex are listed hydric soiils in the state of California.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
X__ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
X__ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
X__ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for short periods in the winter after storm events.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 9

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 00.15" Long: W 121° 58' 02.47" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X		
Hydric Soil Present?	Yes X	No ___	**Is the Sampled Areas within a Wetland?**	**Yes** ___ **No** X
Wetland Hydrology Present?	Yes ___	No X		

Remarks:
Sample site lies approx 10 feet south of drainage ditch along south side of railway.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Hordeum jubata	5	No	FAC
2. Lolium perenne	10	No	FAC
3. Vicia sativa	30	Yes	FACU
4. Bromus diandrus	30	Yes	UPL
5. Avena fatua	15	No	UPL
6. Vulpia myuros	10	No	FACU
7.			
8.			
Total Cover:	105		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:

SOIL

Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 4/2	80	2.5 YR 3/6	20	C	M	C	Common, fine, distinct mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____Histosol (A1)
____Histic Epipedon (A2)
____Black Histic (A3)
____Hydrogen Sulfide (A4)
____Stratified Layers (A5) (**LRR C**)
____1 cm Muck (A9) (**LRR D**)
____Depleted Below Dark Surface (A11)
____Thick Dark Surface (A12)
____Sandy Mucky Mineral (S1)
____Sandy Gleyed Matrix (S4)
____Sandy Redox (S5)
____Stripped Matrix (S6)
____Loamy Mucky Mineral (F1)
____Loamy Gleyed Matrix (F2)
____Depleted Matrix (F3)
____Redox Dark Surface (F6)
____Depleted Dark Surface (F7)
____Redox Depressions (F8)
____Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____1 cm Muck (A9) (**LRR C**)
____2 cm Muck (A10) (**LRR B**)
____Reduced Vertic (F18)
____Red Parent Material (TF2)
____Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Soils remain consistent from ditch to higher elevation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___Surface Water (A1)
___High Water Table (A2)
___Saturation (A3)
___Water Marks (B1) (**Nonriverine**)
___Sediment Deposits (B2) (**Nonriverine**)
___Drift Deposits (B3) (**Nonriverine**)
___Surface Soil Cracks (B6)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leaves (B9)
___Salt Crust (B11)
___Biotic Crust (B12)
___Aquatic Invertebrates (B13)
___Hydrogen Sulfide Odor (C1)
___Oxidized Rhizospheres along Living Roots (C3)
___Presence of Reduced Iron (C4)
___Recent Iron Reduction in Plowed Soils (C6)
___Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___Water Marks (B1) (**Riverine**)
___Sediment Deposits (B2) (**Riverine**)
___Drift Deposits (B3) (**Riverine**)
___Drainage Patterns (B10)
___Dry-Season Water Table (C2)
___Thin Muck Surface (C7)
___Crayfish Burrows (C8)
___Saturation Visible on Aerial Imagery (C9)
___Shallow Aquitard (D3)
___FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? Yes_____ No X____ Depth (inches): ____________
(includes capillary fringe)

Wetland Hydrology Present? **Yes**_____ **No** X____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 10

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 22 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 00.11" Long: W 121° 58' 07.63" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	
Hydric Soil Present?	Yes X No ____	**Is the Sampled Areas**
Wetland Hydrology Present?	Yes X No ____	**within a Wetland?** **Yes** X **No** ____

Remarks:
Sample site lies within wet area that results from water flowing in railway ditch backing-up within culverts under roadway to the west.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Pleuropogon californicus	20	Yes	OBL
2. Rumex crispus	20	Yes	FACW
3. Cyperus eragrostus	20	Yes	FACW
4. Eleocharis macrostachya	40	Yes	OBL
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point:_________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 4/2	80	2.5 YR 3/6	20	C	M	C	Common, fine, distinct mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:____________________
Depth (inches): _________________

Hydric Soil Present? **Yes** X_____ **No**______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X_ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
X_ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

<u>Secondary Indicators (2 or more required)</u>

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): __________
Water Table Present? Yes_____ No X____ Depth (inches): __________
Saturation Present? Yes_____ No X____ Depth (inches): __________
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for extended periods in the winter after storm events.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: 7 City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 11

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ____ Lat: N 38° 16' 01.12" Long: W 121° 58' 20.73" Datum: ____

Soil Map Unit Name: San Ysidro sandy loam 0-2% slope NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	
Hydric Soil Present?	Yes X No ____	**Is the Sampled Areas**
Wetland Hydrology Present?	Yes X No ____	**within a Wetland?** **Yes** X **No** ____

Remarks:
Sample site lies within the ditch that runs along the northern edge of the railway at a point where a swale flows into the railway ditch from the north. Water flows in the north ditch and flows through a culvert to the south ditch.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Pleuropogon californicus	40	Yes	OBL
2. Eryngium vaseyi	20	Yes	FACW
3. Eleocharis macrostachya	30	Yes	OBL
4.			
5.			
6.			
7.			
8.			
Total Cover:	90		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- X Dominance Test is >50%
- ____ Prevalence Index is ≤3.0
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:
Filamentous algal mat covers lowest portion of seasonal pool.

SOIL Sampling Point:_________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/2	80	10 YR 7/8	20	C	M	L	Loam with sand and gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:____________________
Depth (inches): ________________

Hydric Soil Present? **Yes** X_____ **No**______

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X_ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No X____ Depth (inches): ________
Water Table Present? Yes_____ No X____ Depth (inches): ________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for extended periods in the winter after storm events.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 12

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ____ Lat: N 38° 16' 01.14" Long: W 121° 58' 24.87" Datum: ____

Soil Map Unit Name: San Ysidro sandy loam 0-2% slope NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes ____	No X	**within a Wetland?**	**Yes** ____ **No** X

Remarks:
Sample site lies approx 10 feet south of drainage ditch along south side of railway.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Hordeum jubata	5	No	FAC
2. Lolium perenne	30	Yes	FAC
3. Bromus diandrus	40	Yes	UPL
4. Avena fatua	20	Yes	FACU
5.			
6.			
7.			
8.			
Total Cover:	95		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL Sampling Point:_________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/2	80	2.5 YR 3/6	20	C	M	L	Loam with sand and gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:________________________
Depth (inches): ____________________

Hydric Soil Present? **Yes** X **No**_______

Remarks:
Soils consistent with ditch location sampled to the east (Sample Point 11).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes____ No X Depth (inches): ________
Water Table Present? Yes____ No X Depth (inches): ________
Saturation Present? Yes____ No X Depth (inches): ________
(includes capillary fringe)

Wetland Hydrology Present? **Yes**____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 13

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 02.63" Long: W 121° 58' 34.43" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____

Remarks:
Sample site lies within the ditch that runs along the northern edge of the railway at a point just west of the Travis Air Force Base property boudary.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Pleuropogon californicus	30	Yes	OBL
2. Eryngium vaseyi	10	No	FACW
3. Lolium perenne	20	Yes	FAC
4. Hordeum jubata	20	Yes	FAC
5. Lasthenia conjugens	20	Yes	OBL
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	2.5YR 5/2	80	GLEY 2.5/N	20	RM	M	C	Dry Clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Resembles description of Omni Clay in Soil Survey.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X_ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for extended periods in the winter after storm events.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 14

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 03.17" Long: W 121° 58' 45.49" Datum: ______

Soil Map Unit Name: Omni clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____

Remarks:
Sample site lies within the ditch that runs along the south side of the railway at a point where a slough passes through a culvert in the railway from northeast to southwest.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Pleuropogon californicus	30	Yes	OBL
2. Eleocharis macrostachya	30	Yes	OBL
3. Lolium perenne	10	No	FAC
4. Hordeum jubata	20	Yes	FAC
5. Rumex crispus	10	No	FACW
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
6	2.5YR 5/2	80	GLEY 2.5/N	20	RM	M	C	Clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Resembles description of Omni clay loam.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X__ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for several weeks during the year.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 15

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ____ Lat: N 38° 16' 04.44" Long: W 121° 58' 56.36" Datum: ____

Soil Map Unit Name: Pescadero clay loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____		
Hydric Soil Present?	Yes X	No ____	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X	No ____	**within a Wetland?**	**Yes** X **No** ____

Remarks:
Sample site lies within the ditch that runs along the south side of the railway at a point where a large vernal pool intersects the railway south of the property fence line.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Lasthenia conjugens	20	Yes	FACW
2. Pleuropogon californicus	20	Yes	OBL
3. Eryngium vaseyi	10	No	FACW
4. Eleocharis macrostachya	30	Yes	OBL
5. Rumex crispus	10	No	FACW
6. Downingia ornatissima	10	No	OBL
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
6	10 YR 5/2	80	2.5 YR 6/6	20	C	M	C	Clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Resembles description of Pescadero clay loam

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
X__ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for several weeks during the year.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 16

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 05.05" Long: W 121° 59' 02.44" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X			
Hydric Soil Present?	Yes X No ____	**Is the Sampled Areas**		
Wetland Hydrology Present?	Yes ____ No X	**within a Wetland?**	**Yes** ____	**No** X

Remarks:
Sample site lies approx 10 feet south of drainage ditch along south side of railway. Area is elevated from ditch to the north and constructed pond to the south.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Hordeum jubata	20	Yes	FAC
2. Lolium perenne	10	No	FAC
3. Bromus diandrus	40	Yes	UPL
4. Avena fatua	10	No	FACU
5. Vicia sativa	20	Yes	FACU
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

____ Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

SOIL

Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 6/2	80	2.5 YR 3/6	20	C	M	L	Loam with sand and gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
____ Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:
Area potentially disturbed and non-native soils resulting from development to the south and railway and fence construction.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? Yes_____ No X____ Depth (inches): ____________
(includes capillary fringe)

Wetland Hydrology Present? **Yes**_____ **No** X____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Area elevated approx. 3 feet from railway drainage ditch. Most likely no ponding or surface water flow.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 17

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 06.01" Long: W 121° 59' 11.15" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____		
Hydric Soil Present?	Yes X No ____	**Is the Sampled Areas**	
Wetland Hydrology Present?	Yes X No ____	**within a Wetland?**	**Yes** X **No** ____

Remarks:
Sample site lies within the ditch that runs along the south side of the railway at a point where a large vernal pool intersects the railway south of the property fence line.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Rumex crispus	10	Yes	FACW
2. Pleuropogon californicus	20	Yes	OBL
3. Eryngium vaseyi	10	Yes	FACW
4. Eleocharis macrostachya	10	Yes	OBL
5.			
6.			
7.			
8.			
Total Cover:	50		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤3.0
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
6	10 YR 6/2	80	2.5 YR 3/6	20	C	M	L	Loam with sand and gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____Histosol (A1)
____Histic Epipedon (A2)
____Black Histic (A3)
____Hydrogen Sulfide (A4)
____Stratified Layers (A5) (**LRR C**)
____1 cm Muck (A9) (**LRR D**)
____Depleted Below Dark Surface (A11)
____Thick Dark Surface (A12)
____Sandy Mucky Mineral (S1)
____Sandy Gleyed Matrix (S4)
____Sandy Redox (S5)
____Stripped Matrix (S6)
____Loamy Mucky Mineral (F1)
____Loamy Gleyed Matrix (F2)
____Depleted Matrix (F3)
____Redox Dark Surface (F6)
____Depleted Dark Surface (F7)
____Redox Depressions (F8)
x___Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____1 cm Muck (A9) (**LRR C**)
____2 cm Muck (A10) (**LRR B**)
____Reduced Vertic (F18)
____Red Parent Material (TF2)
____Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ____________________

Hydric Soil Present? **Yes** X______ **No**________

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___Surface Water (A1)
___High Water Table (A2)
___Saturation (A3)
X__Water Marks (B1) (**Nonriverine**)
___Sediment Deposits (B2) (**Nonriverine**)
___Drift Deposits (B3) (**Nonriverine**)
___Surface Soil Cracks (B6)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leaves (B9)
___Salt Crust (B11)
___Biotic Crust (B12)
___Aquatic Invertebrates (B13)
___Hydrogen Sulfide Odor (C1)
___Oxidized Rhizospheres along Living Roots (C3)
___Presence of Reduced Iron (C4)
___Recent Iron Reduction in Plowed Soils (C6)
___Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___Water Marks (B1) (**Riverine**)
___Sediment Deposits (B2) (**Riverine**)
___Drift Deposits (B3) (**Riverine**)
___Drainage Patterns (B10)
___Dry-Season Water Table (C2)
___Thin Muck Surface (C7)
___Crayfish Burrows (C8)
___Saturation Visible on Aerial Imagery (C9)
___Shallow Aquitard (D3)
___FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X____ Depth (inches): ____________
Water Table Present? Yes_____ No X____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X____ Depth (inches): ____________

Wetland Hydrology Present? **Yes** X____ **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for several weeks during the year.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Travis AFB Pipeline and Fuel Tank Project City/County: Solano Sampling Date: 4/24/08

Applicant/Owner: Travis AFB State: CA Sampling Point: 18

Investigator(s): Nick Ricono Section, Township, Range: T 5N, R 1W, Section 21 of Elmira quad

Landform (hillslope, terrace, etc.): ______ Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): ______ Lat: N 38° 16' 06.45" Long: W 121° 59' 15.38" Datum: ______

Soil Map Unit Name: Antioch-San Ysidro 0-2% slope NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation No , Soil No , or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation No , Soil Yes , or Hydrology Yes naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	
Hydric Soil Present?	Yes X No ___	**Is the Sampled Areas**
Wetland Hydrology Present?	Yes X No ___	**within a Wetland?** **Yes** ___ **No** X

Remarks:
Sample site lies within drainage ditch constructed along southern edge of existing railway. Area is previously disturbed but has had little disturbance in several years and hydrology/vegetation has most likely naturalized. Surface water flow is to the west.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Bromus diandrus	20	Yes	UPL
2. Lolium perenne	20	Yes	FAC
3. Hordeum jubata	10	No	FAC
4. Erodium botrys	15	Yes	UPL
5. Avena fatua	5	No	UPL
6.			
7.			
8.			
Total Cover:	65		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ___ No X

Remarks:
Bottom of ditch contains bare ground covered with a filamentous algal mat.

SOIL Sampling Point:__________

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 4/2	90	2.5 YR 3/6	10	C	M	C	Common, fine, distinct mottles

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

____ Histosol (A1)
____ Histic Epipedon (A2)
____ Black Histic (A3)
____ Hydrogen Sulfide (A4)
____ Stratified Layers (A5) (**LRR C**)
____ 1 cm Muck (A9) (**LRR D**)
____ Depleted Below Dark Surface (A11)
____ Thick Dark Surface (A12)
____ Sandy Mucky Mineral (S1)
____ Sandy Gleyed Matrix (S4)
____ Sandy Redox (S5)
____ Stripped Matrix (S6)
____ Loamy Mucky Mineral (F1)
____ Loamy Gleyed Matrix (F2)
____ Depleted Matrix (F3)
____ Redox Dark Surface (F6)
____ Depleted Dark Surface (F7)
____ Redox Depressions (F8)
x Vernal Pools (F9)

Indicators for Problematic Hydric Soils [3]:

____ 1 cm Muck (A9) (**LRR C**)
____ 2 cm Muck (A10) (**LRR B**)
____ Reduced Vertic (F18)
____ Red Parent Material (TF2)
____ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:______________________________
Depth (inches): ______________________

Hydric Soil Present? **Yes** X **No**________

Remarks:
Problem soils in the project area with extensive histoical clay pan vernal pool complexes. Soils of the Antioch-San Ysidro complex are listed hydric soiils in the state of California.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
X Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
X Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
X Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Plowed Soils (C6)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Thin Muck Surface (C7)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes_____ No X Depth (inches): ____________
Water Table Present? Yes_____ No X Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes_____ No X Depth (inches): ____________

Wetland Hydrology Present? **Yes** X **No**_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Most likely surface water present for short periods in the winter after storm events.